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WATER, RIFLE AND BARRIAGE COMPONENTS OF PEDIATRIC HEALTH CARE

A STORY IN 2014

by
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PREFACE

The WHO and the ORSHF requested the Indian Institute of Public Administration to do an evaluation study of water supply and sanitation as components of primary health care and development. The Government of India through the CPHEO was also involved in the study. The ORSHF/WHO Joint Committee on Health Policy had prepared a framework design protocol. The research design called for a general evaluation of the programme in the country as a whole, to also call for studies at "sector" and village levels, an informal advisory group consisting of representatives of WHO, Indian CPHEO and the IIPA was formed. The advisory group considered the procedures in view of the very short time that was available for preparing the study. It had been decided that case studies would be carried out in the States of Rajasthan and Tamil Nadu. These studies at State level were assigned to the Government of Rajasthan in Jaipur, Rajasthan, and the Madras State Rural Development Board, Madras. The following were responsible for the studies:

- | | | |
|------------|---|-----------------------|
| Rajasthan | - | Dr. C. S. L. Narain |
| | - | Dr. S. S. Patel |
| Tamil Nadu | - | Dr. S. S. L. Pillay |
| | - | Dr. V. S. Subramanian |
| | - | Dr. K. Subramanian |

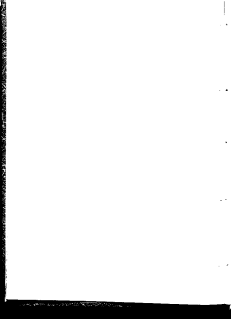
The two Administrations have done a very commendable job within the short time that was available. The two case study reports were extensive and it was not possible to incorporate them in their totality in the final report. They have consequently been summarized summarily and it is hoped that the condensed version provides a realistic summary of the situation with regard to water supply and sanitation in the two States. The work done by the two Administrations is greatly appreciated.

The report at the national level was prepared by the national coordinator, Dr. S. S. L. Narain, with the assistance of Dr. S. S. L. Pillay, of the Indian Institute of Public Administration. The national coordinator also prepared the introduction of the two State Reports and put the reports together.

The national coordinator acknowledges the cooperation from WHO, ORSHF and CPHEO. Without their cooperation and support it would not have been possible to complete the report in such a short time. Gratitude is also expressed to the Director of the IIPA, Dr. S. S. Narain, who not only allowed the study to be undertaken but gave all necessary support and encouragement. The responsibility for the views expressed in the report, although discussed with the advisory group, is that of the author.

Table - 1

Dimensions and Design of Blade



Objectives of the Study

Sustained availability of potable water and sanitation systems is dependent not only from the viewpoint of health but also of the total pattern of development. While this is accepted as a principle, it is necessary to assess whether the programmes being implemented are being oriented in accordance with this objective.

The present study is a part of an international study related to water supply and sanitation programmes. The approach to the study has been adopted from the design protocol prepared by the STEPHENS JORDI COMMITTEE on Health Policy. The overall purpose of the study is to assess the programme of water supply and sanitation and to assess to what extent they help, in spite of the social, health care and development development, and, therefore, to study the extent of community participation in the programme.

It is necessary to state at the outset that the study in India is confined to the situation in rural areas, hence only limited information will be made in the urban situation. To be able to achieve the purpose of the study, many specific aspects which have bearing on the implementation of the water supply and sanitation programme need to be considered. These include rural development, agriculture and health programmes.

The financial resources and organizational factors have also to be taken into account. The effects on income and community in the programme and the response of the community will also be looked into.

The premise of the WHO study design protocol was that

- (i) Lack of community involvement and
- (ii) Lack of intersectoral coordination are responsible for failure of programmes.

The design protocol further stated that there is a lack of coordination between the programme of community water supply and other components of primary health care as well as with developmental efforts in other sectors. The awareness of this failure has resulted in greater emphasis being given to integrated development.

The data that are being gathered, are essentially to test the validity of these premises and assumptions with reference to the situation in India.

Research Design

The data in India were gathered at three levels - national, state and local. The information collected at the national level refers to:

National policy, Organization at the Central (Federal) level, Budget allocations, Centre-State Relations, Achievements at National level with regard to water supply and sanitation programmes, Training of personnel and projections for the future.

At the state level information was gathered in the same areas,

at the local level, information was gathered as to the availability of potable water and the extent of its utilization when available. The subjects that was administered had questions on knowledge and attitudes towards health, safe drinking water and sanitation. The extent of people's participation and contribution either in obtaining safe water supply or in maintenance was also studied.

The time available for the study was extremely limited (about 10 weeks). It had been decided to restrict the area studies to two states: Rajasthan and Tamil Nadu. These two states were chosen because they have some problems of water resources. Rajasthan has a vast stretch of desert. Tamil Nadu has widespread dry areas. Further more, there are variations with regard to the organizations, financial resources and people's participation in the two states. It was assumed that these differences would provide some insights into the implementation of water supply and sanitation programmes. Both the states are rather large. Given the short time it was decided that the study at the village level would be confined to one district and village the district to only two blocks. It was decided to select 12 villages and 20 respondents in each village. The respondents were interviewed in each of these villages in order to gather data on the aspects already mentioned. It was suggested that 8 villages should be selected where a drinking water supply programme has been implemented and two villages where the programme had not yet become operational. The data were then collected from 144 respondents.

At the village level information was collected on population distribution, occupational patterns and other environmental conditions. These data have been presented as a part of the report (see studies I and II).

In order to carry out field investigations an institution was identified in each of the two states. The first meeting of these two institutions with the IIPH which was coordinating the study was held in late December, 1979. A common research design and questionnaire were developed. The questionnaire had to be translated into the regional languages in order to be administered to the local people.

THIS LAST CASE. The field work started in the second half of January and was completed in the second half of February, 1968. The tabulation, analysis and writing up of the report had to be done in a very short time. One of the major constraints in the study was that it had to be completed in 10-12 weeks.

The present report could be considered as an interim report. There is need to look more closely at the data. It was, however, agreed when the study was undertaken that it would only be tentative. In only two states have been studied and even within these only a small number of villages in one district. It has not been possible to derive any substantial general conclusions. There is need for a much deeper study. The information collected in the two states should be collected for all other states. Moreover, the data should be collected in each of these states from different geographical areas as they are very varied within the state itself (coastal areas, alluvial areas, drought prone areas, heavy rainfall areas, etc.).

In the present study the financial estimates alone made it necessary to confine the study to very limited geographical areas. However, looking over the data, one can say confidently that substantial data were collected. It is possible to suggest some tentative conclusions as well as give some guidelines with regard to policy, organization and implementation.

Methodology

A substantial part of the data has been collected through available documents. The limitation of these documents is that it is not possible to get the most up-to-date statistics. The study has had to rely to a very large extent on the data of the Fifth Five Year Plan. (It is expected that the Sixth Five Year Plan draft report would be available soon, but it was not possible to wait for this). Efforts have been made to update the data to the extent possible through discussions with the various ministries and departments.

Organization of the Report

Part I deals with the problem and the methodology. Part II gives background information on the country and policies with regard to rural development, agriculture and health. Part III provides an analysis of water supply and sanitation programmes. Part IV contains some studies of the two states. The last Part V gives a summary of the findings, and highlights the important aspects which need to be considered in the future with regard to water supply programmes.

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Country Background and Religion

Background Information

Population

India is the second most populous country in the world, and ranked as the seventh largest country, covering an area of 3,280,141 square kilometers. According to 1971 census, the country had a population of 347.71 millions - urban 201.28 million and rural 146.43 million. About 82% of the population lives in rural areas. The overall decline of population between 1961-1971 was 14.7%. In 1961, 88% of the total population lived in the urban areas, and this increased to 82% in 1971. An annual increase of about 2.2%. The growth rate of the rural population between 1961-71 was approximately 2.2% per year. The estimated population for 1977-78 is 4.26 million. The proportion of urban to rural remains about the same.

Government

The constitution is federal in structure with unitary features. The President of India is the constitutional head of the executive and the union. The jurisdictions of the union and the states are demarcated under the Constitution. A system of self-government also functions. The parliamentary system of government of India is based on adult franchise whereby all citizens of India who are not less than 21 years of age have the right to be registered as voters in any elections to the union and to the states. There is a separation of legislative, executive and judiciary functions. At the union (Federal) level, the President is elected by an electoral college. The Vice President is also elected in a similar manner. There is a Council of Ministers headed by the Prime Minister. Each ministry has a Secretary to advise the minister on policy and administration.

At the state level, the executive consists of the Governor and a Council of Ministers with a Chief Minister as the head. The District Administration is under the Collector who is responsible for the collection of revenue and maintenance of law as well as development programmes. In some states Corporations have been established for major cities under specific acts of the state legislatures. These are headed by an elected Mayor. For all other towns and cities there are municipalities having elected boards and councils which elect their own Mayor. The system of Panchayati Raj or democratic decentralization involves a three-tier system of local-level government body at the village, block and district levels. Specific powers and functions in the field of development and local administration have been assigned to panchayati Raj institutions.

Economic Conditions

There is risk in the national estimation and comparison. However, these comparisons have not been explained fully. The Indian economy is still predominantly agricultural. About half the national income is derived from agriculture. About 70 per cent of the people are dependent on agriculture. There has been concerted effort to diversify the economy by increasing the pace of industrial development and also agricultural productivity. The GNP in 1949-50 was Rs 120 000 million. In 1975-76 it was Rs 341 000 million. The national per capita income was estimated to be around Rs 250 (US \$70) per year. The national per capita income for 1980-81 was Rs 260. However, the index of prices, 1973-74=100, shows it was 147 in 1980-81.

The census shows the workers have also increased. According to the 1970 census out of 341 million, 180 million were workers. About 120 million of them are engaged in either cultivation or agricultural labourers. About 20 million are engaged in manufacturing, processing, etc., while about ten million are in trade and commerce. 13.1 million workers are those working in transport, storage and communication.

The number of out-workers is around 100 million. The unemployment problem is acute nation. A very large number are registered in the Employment Exchange (about 5.3 million). However, this does not give the full picture as registration in the Employment Exchange is voluntary.

Education and Health

The literacy rate in India has gone up from about 17 per cent in 1950 to about 30 per cent in 1975. It is estimated that about 60 per cent of children in the age group of 5 to 11 are at school as compared to the 30 per cent about 20 years ago. The allocation for education expenditure was Rs 1 500 million in the Fifth Plan which went up to Rs 12 000 million in the Fifth Plan. The constitutional provision for free and compulsory education for the age group of 6 to 14.

A great deal of emphasis is also laid on adult education. In the recent years, emphasis on adult education programme has shifted from adult literacy to functional literacy and non-formal education programmes. Special steps are being made to provide opportunities for education of women. The overall literacy among women is about 17 per cent as compared to about 30 per cent among the males.

A scheme for rural higher education was reported in 1968 for providing secondary education to rural youth. The persons trained in these institutions were to be engaged in rural developmental programmes at the national and state levels.

The welfare programme in India includes many activities for the welfare of women (vocational training courses, combined courses of education of adult women, women organizations, etc.). For children, the programme includes welfare programmes, integrated child development services, foster care homes and pre-vocational development services. Various programmes for improving the health and conditions of the backward classes have also been worked out to the Social Welfare Department.

The Rural Areas

More than four-fifths of India's population live in the rural areas. The number of villages is estimated to be 534,000. In the rural areas about nine-tenths of the population depend on agriculture. As such, the income of rural households is directly related to either the size of the farm holdings and their productivity or the wage employment provided in the farm sector. As per the Agriculture Census Report 1975, 16.2 million operational holdings were in the size group of less than 1 hectare, and another 11.1 million in the size group of 1-4 hectares. Holdings in the size group of less than 1 hectare constituted 1% of the total holdings.

The area under the operation of holdings in the size group of less than 1 hectare forms 9% of the total area under cultivation and 1% in the size group of 1-4 hectares. Thus 9% of the holdings in the size group of less than 1 hectare accounted for only 9% of the total area under operation. Besides the preponderance of tiny size of farm holdings, there are vast areas of permanent cultivation - a fact which further accentuates rural poverty. It is estimated that about 100 million hectares lie in arid and semi-arid areas, another 25 million hectares of land is subjected to frequent floods, and 1% of the gross cultivated area is totally dependent upon the vagaries of rainfall having no means of irrigation whatsoever.

According to 1971 census, of the total rural population of 428.8 million, the number of workers was 194 million (45%) and non-workers 234.8 million (55%). The census categorized a person as a worker if he worked according to his main occupation as reported by him. Among the workers, 58% were cultivators, 11% were agricultural labourers, 18% were working in the sectors of livestock, forestry, fishing, plantation, etc. and only the remaining, i.e. 13% were engaged in activities like mining and quarrying, manufacturing and processing, household industry, construction work, trade and commerce, transport and other services. The non-workers included those in household duties, retired persons etc.

The 'small peas' in and large consists of small and marginal farmers having land holdings less than 2 hectares, tenants, share croppers, landless agricultural laborers and rural artisans. Of the 4% male workers engaged in directly working on land, only 46.4% are cultivators having rights of ownership or possession over the land. The remaining 53% are landless agricultural laborers with no rights whatsoever in land. The percentage of cultivators in total agricultural workers declined from 12% in 1941 to 4% in 1971. On the other hand, the percentage of agricultural laborers increased from 12% in 1941 to 53% in 1971.

The problems of health, water supply and education are much more acute in rural areas as compared to urban locations. The development plans are described in a later section.

Policies

The present study is concerned with the question of integration of water supply and sanitation programmes not only with health but also with general development programmes. As mentioned earlier the study is confined primarily to rural areas. In order to provide the integrated nature of the problem it is necessary to have a brief look at policies and programmes that relate to rural development, agriculture and health.

Rural Development

It has already been mentioned that more than 80 per cent of the population of India live in rural areas. Since Independence (1947) substantial emphasis was laid on rural development.

The Community Development Programme was launched at the end of 1952. The basic objective was to secure the fullest development of the human and material resources on an area basis and thereby raise the rural community to higher levels of living with active participation and on the initiative of the people themselves. One could say that the basic objectives remained the same although there have been changes in the strategy and programmes. For administering Community Development, the country was divided into about 1000 blocks. Each block has about 100 villages with a population varying from about 25,000 to 200,000. The Block Development Officers with 2 Assistant Officers who are subject specialists (Agriculture, Animal Husbandry, Cooperatives, Industry, etc.) are in charge of the programme. The Community Development Programme has now covered almost the entire country.

In 1958 a committee was set up to evaluate the community development programmes. This committee felt that the response of the people was not sufficient and it had suggested the establishment of institutions which would enable the people's participation. These institutions were called *panchayati raj* institutions² and had a three tier system - district, block and village. The pattern is still operational.

In 1960, the National Agricultural Extension Programme (NAEP) was taken up in 15 districts, one in each state. It has also been known as "package programme". The idea was to provide all the inputs which were necessary to achieve agricultural production. The effort was essentially to maintain the production in those areas which had better endowments in terms of land, water and climate. The inputs provided were fertilizers, insecticides, pesticides, improved agricultural machinery, irrigation water, etc.

An assessment of the rural development programmes indicated some gaps. It was felt that in spite of the various programmes not all the sections of the village population were benefited. The strategy in the Fifth Plan was that the development in the rural areas was to encompass both support and integration in all relevant programmes bearing on increased agricultural production and reduction of unemployment among small farmers and agricultural labourers. The minimum needs programme was to be implemented as a major task.

The minimum needs programme was evolved during the fifth Five Year Plan. This programme developed as the analysis of the programme in rural areas had indicated that the provision of social amenities had failed to have the desired impact. The objectives of the minimum needs programme were as follows:

1. Facilities for elementary education for children up to 14.
2. Providing a minimum without availability of public health facilities which would include preventive medicine, family planning, nutrition and the detection of early morbidity and adequate arrangements for referring serious cases to an appropriate higher echelon.
3. Supplying drinking water to villages suffering from chronic scarcity or having meagre sources of water.
4. Provision of all-weather roads.

² Panchayati was the connotation of traditional village assembly.

4. Semi-sites for landless laborers in rural areas,
5. Carrying out the environmental improvement of rivers,
7. Improving the standard of classification to cover approximately 70 to 80 per cent of the rural population,

There is continued emphasis on improving the living conditions of the people in rural areas. The strategy is to have an integrated approach to development.

As indicated earlier, the programmes launched have not had the expected impact. There were policy disparities. Consequently, special programmes were introduced for specific groups or areas. Among these the important ones are:

1. Drought prone areas programme,
2. Small Village Development Scheme,
3. Small farmers development agencies,
4. Marginal farmers and Agricultural labourers development,
5. Integrated tribal development programme,
6. Land development programmes,
7. Applied Nutrition Programme,
8. Institute for Rural Employment, etc.

It is not possible to go into details of any of these programmes. However, description of one or two programmes would be of interest. The drought prone areas programme covers the rural chronically drought affected areas. Its major thrust is to remove ecological balance. It is in operation in 24 districts. Its approach is to have a comprehensive area of development. It aims at optimal utilization of land, water and livestock. Programmes include soil conservation schemes, rural immunization, soil conservation, afforestation and improving water supply. Further, the programme has focused on creation of rural works and employment generally.

The achievements in rural development are quite impressive. Nevertheless, there are wide areas to be covered. The policies and programs which are emerging are an effort to bring about development of all areas and all sections of people. This is the essence of the approach to integrated rural development.

Agricultural Policy

About 75 per cent of the population is dependent on agriculture and allied occupations for their livelihood. About 120 million hectares are under cultivation. Of this area about 21 per cent is irrigated. The outstanding features of agricultural production was a wide variety of crops and the preponderance of food crops over nonfood crops. The overall food production was about 115 million tonnes in 1980-81. The food situation is fairly comfortable. During 1981, 3 million tonnes of foodgrains were

imported to supplement the domestic supply. There is a public distribution scheme through fixed price shops particularly in the wheat sector. For wheat, rice and sugar, minimum support price is an essential feature of the policy for many years. Reserves are purchased by government for public distribution at the support prices. To impart stability to the country's food and economy, the Central Government had built up a supply of nearly 2 million tonnes of wheat in 1972; it is now thought to be around 3 million tonnes.

The policy with regard to agriculture can be detailed under the following headings:

Agriculture development programs, agricultural marketing, Agricultural Research, Agriculture Education, Land Reforms, Animal Husbandry, Forestry and Irrigation.

With regard to the development programmes some directions were brought under the National Agricultural Direction Programme to which reference has already been made in discussing the rural development policies.

Multiple cropping was initiated to increase the intensity of land utilization through optimal use of the existing irrigation facilities as well as new irrigation schemes.

The high yielding variety programs which was initiated in the late thirties is being continued. It was expected that it would cover about 14 million hectares by the end of Fifth Plan.

The programs included provision of fertilizers and quality seeds. Substantial attention is being paid to soil and water conservation. There are efforts to promote integrated agricultural development in dry areas of the country. The drought prone areas programs has already been mentioned. The programs on land reform included abolition of intermediaries, tenancy reforms, distribution of services, land ceiling on holdings, and consolidation of holdings.

The progress of schemes on which agriculture is dependent has made it necessary to accord a high place in National Development Plans for irrigation. About 750 irrigation projects were taken up after independence out of which a little more than 400 have been completed. The total irrigated area in the country which was about 18 million hectares in 1950-51 had gone up to 45 million hectares at the end of 1974-75. An assessment of the water resources of the country has been made (The details of this assessment are given later).

The approach to agriculture development is essentially to ensure self sufficiency in the foodgrains.

These programmes are an effort to help in achieving this objective. Apart from this, under-privileged groups are being covered for through programmes meant specifically for them. The need for spreading the benefits of the development programme to all sections of the rural society is realized. Institutions continue with growth in the assigned objectives.

Health Policy

The data with regard to population have been given earlier. Expectation of life has gone up from 44.8 years in 1961-62 to 52.4 in 1974-75. The infant mortality rate which was 244 per 1000 in 1971-72 is now estimated to be 212 (211 in rural areas and 81 in urban areas). There are 0.5 hospital beds available per thousand population which is about half the desired norm. For every 4000 people, there is one doctor and for a population of 4000 one nurse is available. It must also be noted here that these figures do not indicate the total situation as there is wide difference between the urban and rural areas. The number of doctors and nurses available in the urban areas is very much higher.

The per capita expenditure on medical services and public health during the years 1972-73 is estimated at Rs 7.5 (Rs 11.15). There is wide variation in the country with regard to the expenditure on medical services and public health, while it is Rs 8.8 per capita in Uttar Pradesh, it is Rs 1 in Rajasthan. The majority of the large states spend less than Rs 10 per capita per annum. The smallest states tend to have a higher allocation per capita. At the end of 1974, there were 1075 primary health centres (described later) and about 18 000 sub-centres.

The number of cholera cases reported in 1973 was about 21 000, in 1974 - 37 200 and in 1975 (up to September) - 9 328. In 1975, there were 1 528 deaths, in 1974 - 841 and in 1973 - 443.

In 1974-75, there have been no reports of smallpox. In 1973, the reported cases were 1244 with 288 deaths. In 1974, there was no epidemic. The reported cases in that year were 288 with 34 deaths.

As for Malaria the total number of cases reported in 1972 was 1 430 430 and in 1974 it was 2 830 800. While there were no deaths in 1972, there were 40 deaths in 1974.

The major causes of deaths in the rural areas according to a survey were:

Coughs and disorders of the respiratory system	20%
Fever	16,1%
measles pandemic in infancy	10%
diarrhoea	10%
accidents and injuries	4%
disorders of the circulatory system	4%

The present health policy has emerged over a period of time. The most important objectives of national public health policy is to ensure basic medical health care to the great majority of people in the country. In India, more than three decades ago the Moon Committee in its report explicitly designated the need to ensure health services organization and medical education to such the comprehensive needs of the population. The committee recommended setting up a network of primary health centres to cater to the preventive and curative health care needs in rural areas, a supportive network of secondary health centres and district hospitals for hospital and other referral services and expansion of education and training facilities for health services personnel. The recommendations of this committee are being progressively implemented as part of health services development programmes launched in the different Five Year Plans.

During the Tenth Five year plan Primary Health Centres (PHCs) were set up as part of a national rural development scheme called "Community Programme" with a very modest staff in each centre to serve the needs of integrated health services and cater to the need of about 30,000 to 100,000 population in a block. After the Centres came in operation for some time it was realized that they were not able to cater to the comprehensive health needs of the population that were supposed to serve. Subsequently, the National Committee (1940) after reviewing the situation recommended speeding up the pace of development of new PHCs, but strengthening the existing ones.

There are 1 1/3 PHCs and 38 000 sub-centres in the country. These Centres provide basic medical care to the community. A PHC covers a population of about 100,000 and has one or two doctors plus about 40 para-medical staff.

^a See Health Care Services (Draft Plan), Ministry of Health and Family Planning, Government of India, New Delhi

It is doubtful whether the setting up of these centres has resulted in significant improvement in the health status of the rural population. Little still needs to be done in the "physical quality of life index (QALY)". When compared to other areas of the world, in spite of the expansion of rural health infrastructure, the health care coverage is very limited in the rural areas and the concept of preventive and promotional health care are barely provided due to the health delivery system. The major emphasis of the existing health care is on curative services, while the majority causes of morbidity among the Indian Population lie in the area of preventable diseases. Even the existing services are not reaching the people adequately thereby resulting in continuing ill health and continued suffering and disability.

It has been realized that improvement cannot be brought about merely by increasing the number of doctors or the number of centres, but only by making each individual realize the need for simple steps to sanitation, prevention, promotion etc. of health activities which can make remarkable changes in the morbidity and mortality patterns in this country. No education and adequate effort has so far been made to involve the community in taking care of itself and seeking assistance when such assistance is needed.

In the Fifth Plan, the aim was to provide statutory public health facilities integrated with family planning and services for vulnerable groups, children, pregnant women and lactating mothers.

1. Increasing accessibility to health services in rural areas.
2. Intensification of the control and the reduction of communicable diseases especially Malaria and Dengue.
3. Development of curative services by providing specialists in the upgraded primary health centres in rural areas.
4. Qualitative improvement in the education and training of health personnel.

Having realized the need to make the health services available at the village level, the Ministry of Health has drawn up a new scheme known as "community health workers" for strengthening health care services in the rural areas. The purpose behind this scheme is to provide adequate medical care to the rural people and at the same time to educate them in matters of preventive and promotive health.

Under the new scheme every village with a population of 1,000 will be expected to elect its own representative - one who belongs to the community, enjoys its confidence and has the ability and competence to serve it in the area of health. The representative is given suitable training by teaching simple and basic health problems. The workers are then to attend to their normal vocations - agriculture, teaching, craftsmanship, etc. They will render health service to the community in their spare time for one or three hours every day. It is expected to establish about 500 500 community health workers in the coming years. The community health workers are expected to give medicines to common ailments to the people. For more serious illness, they will refer the people to Primary Health Centres. However the major function of the C.B.P. is one of education.

In the rural areas a large number of people make use of the indigenous system of medicines. There are about 15,000 registered practitioners of this system, 15,000 dispensaries and 250 hospitals which provide medicines following the indigenous system are also functioning. The policy is to achieve a uniform standard of education in the Indian system of medicines. A council which was set up in 1971 has formulated uniform syllabi for undergraduate education. Some post-graduate education is being imparted in a few institutions.

Water Supply and Sanitation Program

Water Supply and Sanitation Programmes

In the previous section the rural development, agriculture and health policies have been briefly described. It is only in the minimum needs programme that a concern for water supply has been indicated. When the Central Public Health and Environmental Engineering Organisation (CPHEEO) was established in 1954, it was under the Ministry of Health. In 1971, it was transferred to the Ministry of Water and Housing.

The coverage of Policies, Programmes and the Machinery for implementing the rural Water Supply is described as under.

Historical

During the pre-independence era the Hunter Commission (1904) was appointed by the Government of India to review the general health problems including the availability of safe drinking water supply on a national scale. The Commission made a number of recommendations, and suggested that the target should be to provide safe water for drinking purposes to the entire population, within a period of 20 years, with the following priorities:

- (1) places where there is incidence of cholera and other infectious diseases,
- (2) important places for trade and commerce,
- (3) places located on important lines of communication and
- (4) places where there is difficulty in obtaining water during the hot weather.

After Independence the Government of India appointed another Technical Committee (1948), the Environmental Hygiene Committee, to look into the same problem. The Committee recommended that water supply facilities should be provided to 80% of the population within a period of 10 years. It laid down the following priorities for accomplishing this task:

- (1) village centres
- (2) places where the annual death rate due to cholera was more than 500 per 1,00,000 persons for the last two years and
- (3) water scarcity areas

It also suggested that the design, construction and maintenance of Public Health Engineering works be entrusted to Public Health Engineering Departments.

Between the years 1948 and 1961, the Union Ministry of Health set up 3 independent agencies viz., (i) Rural Team of the Planning Commission, (ii) a three-man team sponsored by WHO and (iii) the National Water Supply and Sanitation Commission.

The National Water Supply and Sanitation Commission set up by the Union Ministry of Health made a comprehensive survey of water supply and sanitation in the country and suggested significant organizational, financial and procedural reforms,

An advisory team of the U.S. Public Health Service visited India during early 1961 at the request of the Ministry of Health to review the implementation of the rural water supply scheme in the country as a whole. The team visited various parts of the country and suggested the setting up of a single agency at the state level, with a separate organization, for the construction and development of rural water supply schemes. The team specifically recommended that this organization should be responsible for the supervision, operation and maintenance of all rural water supply schemes and also be responsible for the training of staff required for maintenance.

In short, all these commissions have affirmed that implementation of water supply schemes in rural areas is given due recognition and that sufficient funds be allocated to achieve the objective within a specified period. Unfortunately, due to financial and other constraints, the recommendations made by the various commissions could not be properly followed. A beginning has been made to solve the problem since the First Five Year Plan and the implementation is in progress though at a very slow rate.

Assessment of the Existing Water Situation

As early as in 1948, the Ministry of Health felt that an assessment of the rural water supply problem, particularly with reference to the needy areas and the overall cost, was necessary in order to frame a comprehensive plan of implementation. Simultaneously, the Community Development Department conducted a survey on the availability of drinking water in the rural areas from village wells. The survey revealed that there were about 119 000 villages and hamlets without any source of drinking water. Through the Special Investigation Division set up in the States, it was possible

to identify the nature of problem villages in the states under three categories, viz:

- (I) Villages where the drinking water was not available within a distance of 1/2 km or a depth of 30 m;
- (II) Villages where the sources of supply were prone to endemic diseases or poisonous pollution, and
- (III) Villages where the sources contained excess of chloride, fluoride or both in the water.

The first category was defined as scarcity and difficult villages while the second and third categories were defined as toxic problem villages.

The information received from various states revealed that there were 70,000 villages in the country situated in the difficult and scarcity areas, 32,000 villages in the chronic endemic areas, 8,000 villages in the poisonous infected areas and 21,000 villages in areas where the sources contained excessive mineral constituents such as chloride, iron and fluoride.

It may thus be seen that there were approximately 131,000 villages in the country in the difficult and scarcity and other health problem areas. It was considered necessary, as a first step, to give priority for providing safe water supplies in villages exposed to endemic diseases and poisonous infestation. The next step was to tackle the other problem villages. Unfortunately, the implementation did not materialize as envisaged and as yet about 40,000 villages only have been covered leaving a big gap of 91,000 villages.

Importance of Water Supply and Water-related Diseases

Water-borne and water-related diseases are responsible for a large incidence of mortality and morbidity in the rural community. Their control is brought under control by establishing protected water supplies and sanitary methods of excreta disposal. The data available from the various states show the seriousness of the environmental health problem and the effects of villages and people affected by the various water-borne and water-related diseases in the country (of which 25,000 villages are in the zones of Bihar alone) comprising a population of 34.18 million in areas which are endemic to cholera.

The governments affected villages have been estimated by CPHEP to be about 5,384 with a population of 1.84 million in all states including Rajasthan, where a FURTHER 5,380 villages are affected. The higher percentage of the disease in Rajasthan is because of the existence of step wells.

States with high chemical contents such as fluorides, iron and manganese, above the acceptable standard, have been found in about 15,000 villages with a population of approximately 21.75 millions. The fluoride content has been found to be as high as 50 ppm in some areas and parts of Punjab, Haryana, Uttar Pradesh, Rajasthan and Madhya Pradesh are affected.

The impact of water supply facilities on the community will have far-reaching effects not only on the general health conditions but also on the national production in various sectors of our economy. There is sufficient evidence to show that a vast majority of the people, both in the urban and rural areas suffer from communicable diseases, out of which more than 50% may be attributed to unsanitary conditions. Due to poor medical services, a large population is affected by diarrhoea, dysentery, typhoid and other gastro-intestinal diseases every year. It has been considered advisable that instead of spending large sum of money on curative aspects, the diseases could be controlled by preventive measures with less expenditures.

It is estimated that 1,700 million man hours are lost every year due to the suffer of people who are incapacitated by water-borne diseases. It is also further estimated that the nation is losing about Rs 4,000 million per year on account of increased sickness and loss of production.

Rural Water Supply Programmes

Introduction

From what has already been explained, it is obvious that there has been an awareness of the problem of drinking water in rural areas. Programmes have been initiated to meet the needs of the rural people. The programmes in the past as well as the plans for the future are described in the following pages.

Since the commencement of the First Five Year Plan, four different programmes have been implemented for the development of rural water supplies in the country viz.,

- (1) The Centrally Developed Works Programme
- (2) The Local Development Works Programme

(112) Some Ministry's Programmes for Scheduled Classes, Scheduled Castes and Scheduled Tribes, and

(113) The National Water Supply and Sanitation Programme.

The Community Development Programme, administered by the Ministry of Community and Cooperation, was confined to the construction of open shallow wells which could be maintained by Block Development Agencies. This programme has now been merged with the National Water Supply and Sanitation Programme.

The Local Development Works Programme, administered by the Planning Commission, was started to assist the rural water schemes, with emphasis on rural participation. The programme however, ceased its function in the year 1962.

The Scheduled Classes Welfare Programme, administered by the Home Ministry, confined its activities to the construction of simple open wells in rural areas predominantly inhabited by Scheduled Castes and Scheduled Tribes and other underprivileged communities.

The National water supply and sanitation programme was launched by the Government of India in the year 1954 as part of a Health Plan to help the State Governments to achieve better sanitation in the field of urban and rural water supply and sanitation. This programme is being implemented in the different States by various Public Health Engineering Departments and other departments under the advice and guidance of the Central Public Health and Environmental Engineering Organisation (CPHEEO).

Although the programme was initiated in 1954, it could not make much headway because of the high priorities enjoyed by other sectors under irrigation, agriculture and education. While the Government's expenditure increased in other spheres, water supply and sanitation measures did not become their legitimate priority. The experience gained in the First, Second and Third Five Year Plans indicated the impossibility of more states to handle the programme on a comprehensive basis. The Central Government under the plan was in the stage of a total loss to the State Governments which distributed funds to the local bodies partly or less and partly as grants-in-aid submitted by the State Governments. The State Governments had to select the beneficiaries based on their capacity to repay loans or to pay matching contributions. Because of the system of steady allocation of funds down the centre to the states, it was not possible for the State Governments to give priority in respect of manufacturing of schemes, procurement of water materials and equipment, so that there was considerable delay in the implementation of the projects at all stages. This drawback has, however, been noticed considerably from the Third

This appendix is not considered adequate by UNCTAD and the Government

Five percent proceeds by delegating powers of execution and collection to the State Governments in respect of a large category of PWS's, water supply schemes.

The targets set by some of the states for the Fifth Plan period are indicated.

In Tamil Nadu, there was an allotment of Rs. 200 million. The target was to cover 8,000 villages. The criteria for selection of villages were: (i) backward and gravity areas, (ii) earthquake areas. The target in Andhra Pradesh was to cover 18,000 villages with 11,250 haft. The criteria for selection was the same as in Tamil Nadu. Special attention was paid to villages situated in scheduled caste's wards and tribal areas. In Madhya Pradesh the target was 21,000 villages, in Maharashtra 12,000 villages, in Gujarat 1,000 and in Karnataka 10,000 villages. In Karnataka the criteria for selection of villages were:

1. No source village
2. Villages with health problem
3. Villages affected by salinity

In all these states, the concentration of the programme is for installation of hand-pumps as against the supply of power-pumps for water supply.

According to the information available to the 10,000 problem villages have been covered all over the country. There are 26,000 other villages to which water supply has been provided.

It is expected that about 11,000 to 15,000 villages will be covered in 1978-79. An allocation of Rs. 400 million has been made under what is termed as an accelerated programme of water supply. In this programme about 4,000 to 5,000 villages are to be covered. The minimum cost programme has already been commenced. There is an allocation of Rs. 700 million to this programme for providing drinking water. About 8,000 to 10,000 villages are expected to be covered under this programme. Even if the target is achieved it would still leave about one hundred thousand problem villages which will continue to have problems of people and perennial water supply.

At the present rate of progress, it will take a minimum of ten years to cover only the problem villages.

* People with very low socio-economic status. These houses are usually located on the outskirts of the village.

ADMINISTRATIVE SET-UP

MINISTRIES AND INSTITUTIONS AT NATIONAL LEVEL

Water supply and sanitation are water subjects and as such they are a responsibility of the State Governments. At the Central Government level, the Ministry of Works and Housing has been equated with full responsibility for providing water supply, sewerage and sanitation facilities in urban and rural sectors. This is effective from the Fifth Five Yearly Plan (1961), and the earlier budget is controlled by that Ministry. This is a departure from the earlier practice, when other Ministries like the Ministry of Agriculture (Department of Community Development) and the Ministry of Home Affairs had their own schemes for providing water supply in the rural areas, with handpumps and community wells. However, the Works and Housing Ministry, at the time of framing Five year plans, accepted other ministries' involvement in the field of rural water supply. The Ministry of Health has no direct responsibility for this programme at the national level.

The Ministry of Agriculture administers the programme for the wellfields of waters, both surface (canals) and ground (wells), primarily with the object of assisting agricultural production. These programmes are also coordinated with similar activities of the Ministry of Works and Housing.

The Central Public Health and Environmental Engineering Organisation (CPHEE), which is attached to the Ministry of Works and Housing, executes the water supply and sanitation programme in the entire country, and coordinates its implementation by the state government agencies.

It looks after various aspects of the programme like planning, programming, technical scrutiny of schemes, guidance to the states in technical matters, liaison with the executing authorities in the state, monitoring and a follow up of the progress of the work. One of its main functions is to keep in touch with international and bilateral agencies to provide necessary assistance offered by them to the various states. This may include the provision of engineering services, supplies and equipment, carrying of consultants, and fellowships offered by the Governmental agencies for training abroad.

ROLE OF OTHER INSTITUTIONS

The Planning Commission, which is responsible for the overall development of the entire country, coordinates the proposals of all the ministries and finally approves the policies, programmes and allocation of funds to the different ministries for their programmes.

The Central Government Board, under the Ministry of Agriculture, handles the water supply organization and engineering. The Government Division of the Geological Survey of India, which also handles its own field work attached to the Central Government Board.

The Department of Community Development in the Ministry of Agriculture, and the Department of Social Welfare in the Ministry of Education and Social Welfare are not directly concerned with the programs like the PWD Plan. However, these two agencies are concerned with rural water supply by virtue of their task to ensure the overall development of the rural areas.

Organization

The National Committee (NWC) had recommended the setting up of independent statutory boards with adequate power to promote and finance water supply. It had also suggested the setting up of independent Public Health Engineering Departments. The Executive Committee (EWC) noted that there had been some improvement in the position with regard to independent Public Health Engineering Departments since WHO advised 11 states have such departments. As far as independent statutory boards are concerned, only two states Tamil Nadu and Uttar Pradesh have set them up (recently Karnataka and Punjab have constituted boards for urban water supply, and a board has also been set up in Maharashtra for procuring loans for urban and rural water supply).

The organization in some of the states is described below.

High-Level Organization

The burden of management and organization of urban and rural water supply and sanitation almost rests primarily with the various state governments. They are linked up by several agencies, which differ from state to state. One of the five departments - Public Works, Public Health, Local Self Government, Irrigation or Forestry - is generally in charge of the programs.

At least in 11 states have independent Public Health Engineering Departments or look after both urban and rural water supply. In the states of Andhra Pradesh and Gujarat, there are separate Public Health Engineering Departments for urban and rural water supply. In Tamil Nadu, there is an autonomous board to look after the rural water supply programs. The board is Tamil Nadu. It is responsible for planning, and construction and maintenance. The community through the local bodies is expected to contribute to defray the maintenance expenditure.

Various problems have been encountered in an effort to evolve unified policies in respect of maintenance and management of the rural water supply schemes in the country both during execution and afterwards. The diversification of the operating departments in the states has been impossible to some extent for the highest manner in which principles are being given for execution of water supply schemes. Experience of the past shows that there should be one agency or organization in each state, preferably a water board, which should be responsible for implementation of rural water supply schemes from the stage of design and planning to completion and maintenance. Uniform policies and procedures with regard to fixing priorities, selection of villages, design criteria to be adopted, etc., could be evolved and adopted only when there is a unified organization in the management side.

In Andhra Pradesh, the Rural Water Supply Programme is under the Panchayati Raj Department, in Gujarat it is under Panchayati Raj and Public Department, in Madhya Pradesh, the Public Health Engineering Department is in charge. The Rural Development Ministry is responsible for the Programme in Maharashtra, In Rajasthan, the authority in charge is the Panchai and Public Health Department, In Tamil Nadu, there is a statutory body under the Rural Development and Local Administration Department.

The difference in the organization does not only relate to the Ministries or departments under which the Rural Water Supply Programme functions, but the structure of the organization itself is different. In Tamil Nadu, as indicated earlier, it is a statutory body with full financial powers. The division reporting the programme implementation costs with U.S. Water Supply and Drainage Board. The Divisional Engineer can use his discretion to spend the drilling rigs in his jurisdiction. The Chief Engineer is in charge of the programme. Under him are some Superintending Engineers at field levels. There are Civil and Mechanical Engineers to help the S.Es. There is also a Geographical Assistant who locates the well sites.

In Andhra Pradesh, the Department is under the Panchayati Raj Department. There is a Chief Engineer who is responsible for implementing the developmental activities of the rural areas. Public Health and S.Es under the Chief Engineer. Within the Division, the District Collector is responsible for indicating the priority areas. Allocation of funds and priority costs with the Government. The Department also has a Geologist, a Sanitary Engineer and a Hydrogeologist. There is only one Civil Engineer at the District level. All others at the District and at field levels are Mechanical Engineers.

The Public Health Engineering Department is responsible for the administration and execution of the Rural Water Supply Programme in Madhya Pradesh. The policy decisions are made at the Ministry or Government level. Details of the programme are worked out by the Department once the policy is laid down. The Revenue Commissioner can, however, make a request for altering a deployment of rigs - such a request is generally ignored.

The Chief Engineer and the Superintending Engineers are responsible to the Secretary of the Department of Public Health Engineering. In the D.M.O. there is an Executive Engineer in the district and a sub-engineer at the operational level. There are 16 Civil Engineers or persons trained in being so in the set-up.

The Government Survey and Development Agency has been set up as an independent body in Madhya Pradesh. The Planning is basically done at the district level and the DDM is involved in the decision making through the Economic Evaluation Committee. The decisions regarding the financial allocations are taken at the state level and the DDM has powers to implement and shift rigs once the budget allocation is made. The DDM has a R&D-Unit. There are six divisions - survey, drilling, mechanical, administration, accounts and planning. The evaluation team set up by the Government of India in 1971 made the following points:

1. DDM is an executing body rather than a policy making body.
2. The allocation of villages by DDM is arbitrary without any long range planning.
3. The number of technical personnel, i.e. mechanical engineers, appears inadequate.

The Chief Engineer is also a Joint Secretary to the Department of Technical and Health at the Headquarters level. There are Superintending Engineers at the different divisions. Executive Engineers are at the district level. At the operational level are the junior engineers and supervisors. There are Hydrogeologists at the district level.

There are two divisions in Kanals - one in the north and one in the south (conservation of WATER) that is in the north division. The Executive Engineer is in charge at the divisional level. Under him are assistant engineers and junior engineers at the rig level. The Administration and Accounts Divisions are located at the divisional level. The policy decisions regarding financial allocations are finalised by the State Planning Department. The Chief Engineer of the state Headquarters is in charge of both urban and rural water supply.

In Rajasthan, two major departments are involved in the Rural Water Supply Programme. The Public Health Engineering Department is in overall charge of all water schemes. The Government Engineer works the wells for rural water supply at the request of the Public Health Engineering Department. While the Chief Engineer of PHE is located at Jaipur, the Chief Engineer of Rajasthan Government Engineer is at Jodhpur. At the division and the District level are Executive Engineers, Assistant Engineers and Junior Engineers. At the field level, there is a working force. The Department has a service and research wing for carrying out geographical surveys. There is a District Development Authority consisting of Collector, Member of Legislative Assembly and other district officers which decides the schemes to be taken up. The conclusion was that the planning and execution of the programme was rather diffused. There was need for a more integrated approach.

At the rig level, the set-up was similar in all the states with a Deputy Engineer in charge. The other personnel consisted of officers, assistant officers and helpers. There were necessary personnel for the execution.

The pattern of organization is very varied². The basic need in the organization is to be able to take decisions and to implement the programme by itself. In most cases, the decision making is at the level and the implementation at another level of different departments. Both in Tamil Nadu and Maharashtra, there are independent organizations. However, the departments differ. The principal at the lower level tended to feel that they had no share in the planning process. At times, the planning could be effected by the District Collector. The National Water Supply Committee had urged the setting up of standing bodies. The recommendation needs to be seriously considered if the programme is to be expanded. The Estimates Committee had felt that the strategy should be presented to get the organization on a more unified footing.

Coordination at the State

Andhra Pradesh had indicated coordination with the Geological Survey Department. In Andhra Pradesh it was stated that the District Collector acts as the coordinating authority. The other departments connected in Andhra Pradesh are Panchayat, Rural Welfare, Housing and Tribal welfare. There was indication that at the execution level sharing of wells and installation of pump set was more need for coordination.

² The CIPREP and the CIPRES feel that an autonomous independent organization which covers all the aspects of water supply would be most functional.

Some of the states mentioned the need for working with the Health Department. In the minimum analysis, the PROGRAM is expected to give rise to better health conditions and therefore health departments need to be closely associated with the programme. Moreover, the Health Department has an organization reaching the village level.

The general impression gained is that the organization tends to operate in isolation. If the programme is to be part of the total process of development, greater efforts for coordination with community development, Panchayat, Agriculture, Social and Welfare departments is called for.

Other Ministries Involved

The Department of Irrigation and Ecology is the agency which is the implementing organization in the implementation of the programme, wherever necessary.

Legal Status of Systems

A Government Department in which authority has been vested under an executive order, has the legal status to implement the programme, without any other statutory authority. However, autonomous boards derive their authority from Acts of the State Legislatures.

An Act for the preservation of pollution of water has been enacted by Parliament, but this is applicable only to the Union Territories and 12* states, which have given their consent.

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1. Bihar
 2. Haryana
 3. Gujarat
 4. Karnataka
 5. Himachal Pradesh
 6. Jharkhand
 7. Jammu and Kashmir
 8. Kerala
 9. Madhya Pradesh
 10. Rajasthan
 11. Andhra Pradesh
 12. Maharashtra
 13. Punjab
 14. Uttar Pradesh
 15. West Bengal

Financial Allocations under the Five Year Plans

TOTAL, Second, Third, First, Two, Three, Four, and
Fifth Five-Year Plans (1951-1976)

In the first three Plans and the three Second Plans, rural water supply programmes with implemented water local programmes: (I) Community Development; (II) Local Development; (III) National Plan, Scheduled Areas and Scheduled Tribes, (IV) National Water Supply and Sanitation Programme (NWSP). The last programme concentrated on piped water supply schemes, while in the other cases it was mostly wells with construction of handpump tubewell schemes. During this period a sum of Rs 1,120 million was spent under these four programmes supplying 23 million persons or 8% of total population with access to safe water. About 14,000 villages had been provided with piped water supply until April 1965, when the Fourth Plan commenced.

In the first two programmes, the Central Government contributed 50% of the cost as grant-in-aid, and the balance was borne by the local authorities, while in the third, the cost was shared equally by the Central and State Governments. Under the NWSP, 50% of the cost was met by the Central Government as grant, and the remainder was shared by the State Government and the local authorities.

A preliminary assessment during the third Plan revealed that in about 10,000 villages there was no source of water within a distance of 1.6 km (1 mile), or the depth of the water table in the wells was more than 25 metres (80 ft.). Also there were another 41,000 villages, which were having problem areas related to water. The total population affected was nearly 131 million.

Fourth Five-Year Plan (1965-1970)

The outlay in the Fourth Five-Year Plan on Rural Water Supply was initially about Rs 1,150 million. The accelerated Rural Water Scheme, initiated by the Central Government in 1963 provided a further allocation of Rs 340 million and other centrally sponsored schemes such as the NWSP water supply programme added another Rs 21 million making a total of Rs 1,445 million. The total expenditure was about Rs 1,600 million. Priority was given to the aridity and problem villages.

By the end of Fourth Plan about 30 million of the rural population (30%) had access to safe water.

Fifth Five-Year Plan (1974-1979)

An initial allocation of Rs 1,700² million has been made

² Reduced to 1,693 million

to provide access to safe water to 12,500 healthy and problem villages, citing at a population coverage of 95. (45 million). The entire amount is to be spent under the Roshan Kuni Programme in specified areas, under the administrative control of the Ministry of Health and Housing, to ensure proper utilization of funds. If the process could be continued, only 15% of the rural population would be covered by the end of 1985, compared to 30% suggested as the targeted target by the World Health Assembly.

The allocation on rural water supply as a percentage of total plan outlay, has increased from 2.8% in the First Plan to 1.7% in the Fifth Plan. While the annual per capita expenditure on rural water supply as the rural population as a whole, has increased from Rs 1/- to Rs 1.40 from the Fourth Plan to the Fifth Plan, it has remained about steady at Rs 1/- per capita for the urban population.

Drinking Water

To expedite the programme, a scheme known as the accelerated programme has been initiated. For the year 1977-78 a sum of Rs 700 million had been allocated. This is in addition to the allocation already made in the plan budget. For the current year 1978-79, the amount allocated is Rs 800 million. The sum amount is to be granted each year for the next five years (i.e., until the end of VI Plan).

These amounts are lent grant from the Centre to the States, specifically earmarked for supplying problem villages.

Mechanisms and Equipment

Pipes and Pumps

The country is producing all the materials and equipment required for installing the hand pumps. These are available in sufficient quantities. Pipe sizes varying from 1 1/2" diameter to a maximum of 4" diameter are required for implementation and no difficulty has been experienced so far in procurement of such pipes. Other pipes such as Asbestos Cement, Cast Iron, PVC etc., are available in the country, but the introduction may have to be stopped up if rural water supply schemes are sanctioned as a large scale. As regards pumps and equipment, the expenditure and numbers required are very moderate and there are many manufacturers in the country for such equipment. The pipes and pumps, therefore, do not

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presenting problems. The data indicate progressively,

During an earlier study it was found that the handpumps that were installed broke down rather frequently. In one instance, at a given time, more than 50 per cent of the pumps were not functioning. The situation had changed substantially since then. Many experiments were conducted to develop a more sturdy handpump. The handpump that is now being used is a good deal in the Indian Mark II. Although no manufacturers have been selected at the present time, discussions with the people in charge that their performance is quite good. The breakdowns are much less frequent. The Villagers have indicated that there had been no need for repairs over a long period.

Rigs.

India manufactures some drilling rigs. For the hand pump areas, the drive rig is not yet manufactured in India. Some parts are made here, others are imported, and the assembly is done in India.

There are now 140 rigs in operation all over the country in the rural water supply programme. Most of these rigs have been supplied by UNDP. The Government estimates that 500 more rigs will be necessary to complete the programme i.e. to provide potable water to all the problem villages. The rigs are of different types to suit the needs of the varied terrains of the country. While there is need for acquiring more rigs, it is also necessary to make optimal use of the existing rigs. In the evaluation study referred to earlier, it was found that in some states, on an average, the rigs were not in operation for more than half the year. Partly this was due to weather, partly to break-downs and the delay in repairs, and partly to the time taken to move from one place to another. The budget was often insufficient to provide all the necessary inputs for optimal utilization. Some action has been taken to reduce the "idle time" of the rigs. Increasing the number of rigs employed, would mean that states would have to make a larger financial allocation so that the necessary inputs should be provided for the operation of the rigs.

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¹ Substituting the word(s) of parenthesis needs to be emphasized. The Indian Mark II handpump is an product manufactured by two Gupta companies. The question is whether such scale fabrication can also keep up the quality to a controlled standard of previous acceptable to the Indian Standards Commission.

Geophysical Instruments

A large number of states have various types of geophysical instruments. It has not been possible to collect the exact information. While all the states have magnetometers and resistivity meters, bore loggers and seismic meters are only available in few states. The bore loggers and the seismic meters are hardly ever used. The indications were that the magnetometer and the resistivity meter were used, but not sufficiently. These instruments can be used effectively by persons who have the necessary training in geophysics (Geol) Sude, Ashoka Prakash and Mahanandam are the only states that have geophysicists in the department. In Karnataka, there is close coordination with the Department of Geology and Mines. In Andhra Pradesh, the percentage of successful boreholes drilled had increased as a result of the use of geophysical instruments.

Tractors

The condition of the support vehicles for various operations is not fully adequate. The situation is better for the USSR-supplied tractors. The performance of the vehicles also seemed to improve. Earlier, it had been mentioned that the cost of operation of the vehicles (diesel pumps) was prohibitive. There is now a policy of converting all the engines which diesel can be used.

Maintenance

One of the major problems that is faced by various states is with regard to the proper maintenance of the equipment. The problem has been rather vexing, but there seems to be some breakthrough in a few states. In some states both piped water schemes and handpumps fitted in tubewells are being maintained by the State Public Health Engineering Department while in others they are being maintained by local self-government bodies. In previous, it has been found that the local bodies were not able to maintain the handpumps, due to shortage of funds and of persons who could carry out the repairs.

There is a central depot in Bombay for repairing rigs. While this is the main one, there are 2 other repair shops, in Hyderabad and Tinsukia.

The delay in repairs has been and still is one of the major problems in making optimal use of the rigs. The situation has improved somewhat recently. USSR, which used to supply spare parts only for those rigs which it had provided, is now supplying important parts for the rigs bought by the states also. The process by which states could get the parts was rather complicated. While there is progress, there is still plenty of scope for further streamlining of the repair process.

Manpower and Training

With the increase in the development of rural and urban water supply systems over the past two decades, the need for trained and skilled personnel in various fields such as planning and design, construction, maintenance and management is also on the increase. Fortunately, there is no dearth of engineering graduates or sub-professional engineers in the country. There are 128 Engineering Colleges and 167 polytechnics with an annual intake of about 21,000 for graduate courses and 20,000 for diploma courses respectively.

For inservice training programmes for inservice personnel, the CPREB has evolved suitable training courses to suit the different categories of engineers and auxiliary personnel employed in the profession. These training programmes have taken into account the needs of the situation demanding the Total problem, health education amongst rural population, promotional work among local bodies and other problems relating to the efficient performance of the employed personnel.

The P.E.S. training was started as a General Programme under the National Water Supply and Sanitation Programme in 1984. The objective was to impart training in all the fields of Public Health Engineering for in-service personnel and the trainees were provided with financial assistance from the Centre. Post-graduate Engineering courses are held at the All India Institutes of Hygiene and Public Health, Calcutta; Victoria Jubilee Technological Institute, Bombay; Engineering College, Coimbatore; Madras, and Koorkee University, Koorkee, Tamil Nadu. In addition, a three month certificate course in Public Health Engineering is being conducted for sub-graduate engineers at the College of Engineering, Coimbatore, Madras.

The CPREB also conducts several refresher courses of duration varying from one week to six weeks. The extent of people trained in various courses so far is as under²

100	Post Graduate Engineers	795
110	Short-term courses for sub-graduate Engineers	1,842
111C	Water Works Supervisors	150
120	Well Builders	200
121	Water and Sewage Analysis	43
122	Sanitary Works Engineers	56
123	Sanitation System Analysis	10
124	Other Refresher courses	150
Total:		<u>1,356</u>

² Information supplied by CPREB

External Assistance

UNICEF

The UNICEF assistance was first made available to the rural water supply schemes in the year 1963. The RWT soon the UNICEF was in the stage of hardware, materials, equipment and transport confined to a total sum of about US \$100,000 for a few selected states to cover a pilot project benefiting about 20,000 rural population in each area. The projects selected were intended to demonstrate the inter-relationship between the engineering and health aspects of the programme. The programme, however, suffered from inherent limitations in the scope and content. It was realized a little later that the UNICEF assistance could have a greater impact and achieve its objective if the scope of assistance could be changed to one of providing drilling rigs which were not available in the country. Since then, UNICEF has supplied 134 drilling rigs to various states. In order to keep all these rigs in optimum condition the UNICEF has also supplied spare parts and accessories. In 1974, the Ministry of Works and Housing appointed an Technician Team to study and recommend measures to improve the utilization of rigs in the maximum extent possible. The Team has recommended various measures to be adopted in respect of maintenance of rigs, maintenance of completed bore wells, handpumps etc.

UNICEF (Danish Government) has offered assistance of US \$1.44 million, through UNICEF, under UNICEF Rural Project assistance for preliminary work such as drawing up of specifications for the type of rigs required for border regions. Technical details for gravity feed systems in hillier regions are being prepared.

WHO

The WHO Technical assistance has been made available to the National Water Supply and Sanitation Programme since 1971 to the extent deemed necessary by the Central and State Governments. Assistance in rural water supply was at first limited to schools and primary health centres, but was later expanded to include rural communities and, where feasible, groups of villages. Schemes of piped water supply systems and handpumps fitted to bore wells have been implemented.

IBRD

The International Bank for Reconstruction and Development and the International Development Association are implementing a US \$10,000,000 Rural Water Supply Development Project for the State of Bihar, India. The scheme will provide 900 piped water supplies to cover 1,400 villages with a population 600,000.

The table below gives the contribution made by various organizations and governments. All these funds are channelled through UNICEF. The amounts are generally used for materials and equipment.

<u>Source</u>	<u>Contribution</u>
UNICEF	345,000
Indian Government	75,000
CIN	181,000
CMU	11,500
ICC	1,200
UNEP	1,000,000
UNEP/ICU (Canadian)	1,810,500
	<hr/>
	3,413,200
	<hr/>

Rural Sanitation

Sanitary latrines

In the earlier plans, there was some concern for programmes of sanitation. But the present UNICEF subject is hardly mentioned.

Rural sanitation was included as an integral part of the National Water Supply and Sanitation Programme under the Fifth and second Five Year Plans. During the plan periods, about 25% of the cost (ICC by the Central Government and 75% by the states) was paid to beneficiaries for constructing water-seal latrines in their homes by their states. The remaining 25% of the cost which came to about Rs 10/- per latrine, was borne by the beneficiaries. The cost did not, however, include superstructure and this was met entirely by the householder. The present cost of such latrines, however, is between Rs 200/- and Rs 300/-. The programme however did not make such latrines practically feasible. It was pursued in isolation without a supporting programme of rural development as a whole. No estimate is available about the number of latrines constructed in the country. Only a few states such as Gujarat and Andhra have provided funds in the Fifth Plan for the construction of sanitary latrines in the rural areas.

The Research and Action Institute at Elgarh, Rajulgarh, Tehsil, and Ludhiana have set up pilot projects for the safe disposal of excreta in the rural areas and these would form the model for further development of the programme in the country. Efficient designs have been adopted to suit local conditions.

In general, the rural people still preserve the habit of open air defecation. The absence of basic sanitary facilities, such as the disposal of waste water, from houses and the safe disposal of excreta, has made conditions in villages very unsanitary.

The data are available for 1972-73 and 1973-74 regarding some aspects of sanitation. This is given in the table:

	1972-73	1973-74
Rural latrines constructed	34,800	41,000
Pucca drains constructed (batches)	1,741,800	1,761,700
Village level paved (sq.meters)	1,600,000	2,061,000
Sanitary pits constructed	58,000	64,000

It may be of interest to note that neither in the Fifth Plan nor in the Plan for 1971-76 there is any reference to the problem of sanitation. The matter was discussed with the officials. The feeling is that there is need for an educational programme for improving the sanitary conditions in the rural areas. It is also further felt that unless there are specialized committees provided, a sanitation programme by itself would have little meaning. The thinking at the official level seemed to be that the sanitation programme can be deferred until after some of the necessary requirements like safe water supply, medical facilities, etc. are available to the people.

Disposal of Water

The problem of the disposal of water has been mentioned where piped water supply has been introduced. Even in some other areas, where handpump water supplies have been provided, serious problems of drainage are being faced. In some cases where piped water was supplied, the villagers make limited use of the system because of the unsanitary conditions created by waste water, which has also made village lanes impassable. The absence of proper drainage has also led to increase in the mosquito menace and possibly contributed to an increase in malaria in certain areas.

Urban Water Supply and Sanitation

Existing Situation

While the study deals primarily with rural areas, a glance at the urban situation would be useful. The urban population in India according to the Census Report of 1971 was 100.11 million distributed in 7,117 towns. Out of this, 1,840 towns have been provided with water supply covering in theory a total urban population approximately 80%. Most of the towns which have water supply systems are undoubtedly in need of considerable improvements and expansion. Many of the protected water supply systems are deficient in respect of optimum standards of quality and quantity. Many of the towns require constructed areas within the distribution systems. Most of the metropolitan cities are also in need of augmentation of water supply.

One of the main reasons for the present status of urban water supply is the unplanned development taking place in many of the urban towns and particularly the industrial areas. According to information available, about 1500 towns are yet to be provided with water supply facilities. It is reported that most of these towns have population of less than 10,000. It is roughly estimated that the cost of providing water supply in these towns yet to be covered would approximately amount of Rs 11,700 million.

In regard to sewerage facilities, about 217 towns have been provided with such facilities but most of these towns have been only partially covered. It is estimated that about 14 per cent of the urban population has been provided with sewerage systems. Because of the low priority given to water supply and sewerage in First Five Plans, the progress achieved with regard to these schemes is far from satisfactory. In order to provide sewerage and sewage treatment facilities, to about 200 towns with high priority, it is roughly estimated that the cost involved would be Rs 7,800 million. These towns include all the 50 towns situated in agro-industrial areas with filthiness and also those which are faced with rapid water pollution problems. The immediate requirement of urban schemes is, therefore, likely to be of the order of Rs 19,500 million.

Most of the states have separate Public Health Engineering Organizations to deal with urban water supply and sewerage projects. The investigations, design, construction and maintenance phases of urban water supply and sewerage facilities are exclusively within the purview of these Engineering Organizations.

Some of the urban schemes are being financed by plan allocations and partly by loans raised from the Life Insurance Corporation. The Municipal Engineer, however, is very unsatisfactory. From the inception of the water supply and sanitation programme in 1954, hardly Rs 15,000 million have been spent on urban water and sewerage schemes. The expenditure incurred is grossly inadequate compared to the huge magnitude of the problem.

RAJAHMUNDRY

A study² made in close co-operation of field highlighted the inadequacy of water supply and sanitation in urban areas. It was found that there was no potable water supply in 12% of the settlements and in terms of population 40% were not served by any potable water supply. It was reported that the pressure of water was low throughout the year and was extremely inadequate in summer months. The average number of persons per tap was 124 in those settlements where water was available. If the entire population of the settlements was taken, there would be 261 persons per tap. Apart from the taps, handpumps had also been installed. Out of 576 handpumps about 146 were not functioning. Nearly 60% of the settlements did not have any handpumps. The water from the handpumps is regarded by a great majority of inhabitants as unsafe. Those suffering from diseases like diarrhoea, stomach ailments and other water-borne diseases among the people in the urban areas reported quite a high proportion.

The situation with regard to latrines is still worse. For a sample population of 80,000 which was studied, there were only 112 latrine units, giving an average of 120 persons per latrine unit. Most of the latrines are of the dry type. Even those of the water-flush type pose a problem for their cleanliness in the absence of adequate availability of water. The services of the scavengers are not very regular. Because the facilities for latrines are inadequate, they are overused by too many persons and, in the absence of regular cleaning, most of them have not only become unserviceable but also extremely odorous and dirty spots in the settlements.

There are no streets in the settlement settlements. There exist only unimproved cemented drains which are laid along the street, lanes and by-lanes. Only about two-thirds of the houses

² "Drainage Sanitary Settlements in India", R.A.P.D., Government of India, 1972

of settlements surveyed had drains, even though the coverage was partial. Only one-third of the settlements have drains or lined paths. Garbage and refuse are stored near the drains or left on the streets. Less than one-half of the settlements had street-cleaning and refuse disposal arrangements. Even in those settlements, there are few fresh bins. The members of the village are not helpful.

It is also found that there were 3,612 schools, mostly within, in the settlements. These schools tended to aggravate sanitary and hygienic conditions. This may not be a very representative picture of the urban areas as a whole. The slum areas, in which about a third of the city population resides, do have serious problems with regard to water supply and environmental sanitation.

In Assam

Water Supply

The Estimates Committee of Parliament in 1971-72 was concerned with the slow progress of the programme of water supply. By 1971, 11,000 problem-villages had been covered. The latest estimate is that about 14,000 problem-villages have been covered. It is expected that another 16,000 problem-villages would be covered in 1976/78. The progress in the last few years has been more rapid than in the earlier plans. Part of this is due to greater equities, more financial allocations and more concerted efforts. The drought conditions which prevailed in some parts of the country during the last few years provided a further incentive to accelerate the rate of providing water supply to rural areas. In spite of this programme, still 100,000 villages remain to be covered. The sum required for providing water supply to all problem villages is Rs 80,000-crores.

Although there is an increase in the allocation of funds to the programme, it is obvious from the above figures that what has been provided has been inadequate. There is little scope for increasing the amount to any large extent. The allocation is a particular matter to dependent upon the total resources available for the plans. There is a great variation from state to state. Nevertheless, there is a clear indication that all the states are making serious efforts to accelerate the implementation of the programme. However, both financial and personnel resources are limited. In Rajasthan, the amount available for the programme is about Rs 180 millions. Their requirements for completely providing water supply to all the problem-villages would be in the order of Rs 1,000 millions. Even if the funds were available the organisation is not equipped to handle

more than about 800 villages. In Tamil Nadu, the problem villages have been classified into six types. Types one and two which are most seriously affected number about 1,800. The Water Board was hoping to cover all these villages in the coming year. The allocation to Tamil Nadu is Rs 40 million. Out of this Rs 30 million will be spent on urban water supply. The estimated cost for covering 1,800 villages is Rs 260 million. Under the circumstances, it will not be possible to provide potable drinking water to all these villages in the coming years.

The information system is rather inadequate. There is no regular flow of information from the states to the centre. The study made in 1976, was concerned with the lack of proper information. Since then an information cell has been set up at the central level. Some of the states have also agreed to set-up similar cells. It is possible that when the cells begin to function, the flow of information would be better and more meaningful.

Earlier studies have pointed out that handpumps was a serious problem. There is some improvement in this regard. The committee system being tried out in some of the states for maintaining handpumps, the setting up of a Central Board in Delhi, the spare parts being supplied by UNICEF to the state owned by the states, have all helped in improving the performance of the programme. The improved models of handpumps have reduced the break-downs.

The situation with regard to the water supply is far from satisfactory. However, one can take a more optimistic view as the problems have been recognized. This is reflected in the desire to increase financial allocations, to strengthen organizations and to improve the maintenance of the equipment, all of which indicate the positive direction in which the programme is moving.

Sanitation

The situation with regard to sanitation is rather gloomy. A report prepared by WHO in 1974 pointed out that the rural sanitary latrine programme was given up in most states after the Third Plan. There has been no provision for this programme in most of the states since then. The disposal of water and drainage has not received much attention so far. The situation has not changed very much. There is still no indication of any concern with the sanitation programme.

People do not seem to be too concerned over the situation. A study² conducted about 20 years ago in one of states (Gujarat Pradesh)

² Induced Change in Health Behaviour
Mail Publication No. 158, Lucknow 1968

showed "environmental sanitation does not have high priority in the lives of most people". There is lack of awareness of the relationship between the state of health of the people and the level of environmental sanitation in the community. The Lima Residents study also felt that the environmental sanitation activities, if promoted in isolation from other programmes, would have reduced effectiveness.

The Health Ministry does not seem to have any specific programmes for educating people with regard to environmental sanitation. In fact, as the CENED is in charge of both water and sanitation, the Ministry does not feel that it has any responsibility for the sanitation programme. The CENED's primary concern seems to be to provide drinking water to the people. The sanitation programme is hardly mentioned, so it seems that a greater effort could be made to improve the environmental sanitation.

PART - III
Two Data Studies

West Bengal

Basic Data

Background Information

West Bengal is the eleventh largest state in India. It is located in the northern part of India. The population of the state according to the 1971 census was 51.1 million. The projected population for 1981 is 57 million. The birth rate is 28.7 per thousand and death rate is 12.1. The population density is 317 persons per sq. km. Thirty per cent of the state's population reside in urban areas and the remaining 70 per cent live in villages. The literacy rate for the state is 28.4%.

The climate is tropical with temperatures varying from 40°F to 100°F and the average is about 81°F. West Bengal receives monsoon from the southwest monsoon (June to September). Annual rainfall is around 540 mm per year. For the last four years West Bengal has experienced drought conditions but in November 1977, it received heavy rainfall. Agriculture is the backbone of the people with 15% of the total population engaged in agriculture and allied occupations. About 44% of the geographical area of the state (324 540 sq. km.) is under cultivation. The crops grown are rice, wheat, sugarcane, groundnut, cotton, pulses, etc. The per capita income for the state is Rs. 389. This is slightly higher than the all India figure. Thirty-eight percent of the towns and villages have been electrified. Nearly 38% of the agricultural area in the country was functioning in West Bengal.

Agriculture and Rural Development

The policy of the West Bengal Government is to correct the regional imbalance in development, increase the income of the rural population by the provision of irrigation facilities for multiple cropping systems, for the development of agriculture, animal husbandry, dairying and fisheries, employment opportunities in the non-agricultural sectors, particularly for the landless laborers through the establishment and construction of roads, water and other irrigation sources, soil conservation and reforestation, provision of fair price shops in such remote villages, extension of credit and marketing services to small farmers, fishermen and handloom weavers. To extend the programmes for rural water supply, rural roads, schools, adult literacy, rural housing etc. There is also a proposal to set up District Industrial Centers in 7 districts for the promotion of industries.

Medical and Health Facilities

There are 142 primary health centers in the state. Besides the

primary health centers, where are 281 government hospitals. Almost all of these provide modern facilities. There are 1,380 dispensaries of which 50% are village level and 50% are designated facilities. The average population ratio is 1:1400.

There were 2,280 cases of cholera in 1974 with 148 deaths. In 1975 there were 1,958 cases with 48 deaths. The numbers also rose to 653 with 47 deaths in 1976. In 1977 the number of cases reported was 1,214 with 28 deaths. The other prevalent diseases are - gastroenteritis, hook-worm infestation, diarrhoea, dysentery and typhoid. A study conducted in one of the blocks showed an infection rate of 44% among pre-school age children for all parasitic infestations.

Another study conducted among the teenage population indicated an infection rate of 64% for hook-worm and 26% round-worm.

Water Supplies and Sewerage

Until 1967, the water supply needs were attended to by village agencies - Panchayat, Community Development, Gram Panchayat, Health Sub-TRA, etc. In 1943, all the rural water supply schemes were handed over to panchayat control*. The provision of water supply for the centrally located Gram Panchayat was with the Harijan Welfare Department. The implementing agencies were the highway and rural works departments while the maintenance was left to the local bodies concerned. The agency at present for rural and urban water supply is the Tamil Nadu Water Supply and Sewerage Board which was constituted in 1971 as described later.

Rural Water Supply

In 1943, water supply schemes had been extended to 47 towns. With the constitution of a water supply and drainage committee, a planned programme for water supply was developed. The current objective of the Tamil Nadu Government is to cover all the local bodies with a population of over five thousand with protected water supply schemes which ensure piped water throughout the year.

Out of the 144 urban water supply works in Tamil Nadu, water supply schemes in 254 units are either in operation or underway. Water supply is needed in the remaining 444 units out of which 138 units investigations are in progress, covering a population of 4 million. The approximate cost for providing water supply is estimated at Rs. 450 million. The schemes are financed by the local bodies through the water supply and drainage board and loans are given by the State Government when needed. The Life Insurance Corporation also makes loans, not directly to the local bodies but through the Tamil Nadu Water Supply and Sewerage Board. About Rs. 275 million has been lent by the LICI

* Panchayati Rajans are local self-government bodies operating in a block - block or administrative units for Community Development covering a population of 40,000 to 100,000.

Water Supply

The main sources of water for the urban areas are the sub-surface water drawn from infiltration galleries and wells. This is the cheapest source of water since it does not require any treatment in most instances before it is supplied to the community. The supply of water to the community is through a distribution system network with mainlines and public taps or facilities for the provision for house service connections. Usually, the scheme is designed for a projected population at the end of 50 years. The per capita supply may range from 48 lpd to 240 lpd depending upon the state and the population of the town.

Rural Water Supply

According to the survey conducted in 1976, 4 Kd villages did not have any water supply, 125 villages depended upon protected sources and 11 Kd villages suffered from inadequate water supply. The total number of villages covered by the end of 1977 was 8 Kd.

For future planning the villages have been categorized into 4 types from Table I., while preparing the estimates indicated in the table, the following norms were adopted together with the following facilities in the villages:

a) For habitations with population of less than 500	One borewell with handpump
b) For habitations with population of 500 to 110	Two bore-wells with handpumps
c) For habitations with population of 700 to 1 500	One bore-well with pump-group and ground level reservoir
d) For habitations with population of more than 1 500	One bore-well with pump-group and overhead tank.

If the source is available the habitation, a bore-well with a pump may not be provided irrespective of the population. The total amount required to cover all the 25,000 habitations will be Rs. 700 million. Due to paucity of funds, priority will be given to type 1 and 2 habitations. Habitations with no source and habitations with inadequate water are covered.

TABLE 1. CHARACTERISTICS OF VILLAGES, POPULATION AND ESTIMATION OF COST

Climate- Elevation	Settlement	No. of Settlements	Area occupied by providing water supply Qm ² in village	Population to be served(Qm ²)
Type 1	Settlements with no space within the settlement	1/500	75,000	1 000 000
Type 2	Settlements where the nearest public water supply is available within	2/100	40,000	400 000
Type 3	Settlements where water is provided but cannot be met internally	3/400	140,000	2 000 000
Type 4	Settlements where water is provided and provided but the source is either privately owned or self- served	4/500	100,000	1 500 000
Type 5	Settlements where there is no good source within the settlement but an alternative good source is available within 5 km.	1/300	30,000	300 000
Type 6	Settlements where there is a good source available	10/100	100,000	20 000 000
		10/500	500,000	20 000 000

Source: World Bank, World Supply & Distribution Board, 1977-1978

The approximate expenditures on this account will be Rs. 700 million. The Village Committees for 2000/01 in Rs. 20 million each or of Rs. 40 million from each State and 40 million of central assistance under the accelerated rural water supply program.

The plan is to provide organized potable and personal water supply to the type 1 and 2 habitations before the end of 1980/81.

For habitations of less than 100 people the approach is to provide these habitations with a handpump. The population between 100 and 1,000 is provided with a supply for 1 unit where with a pump-rang is to be installed. For a population between 1,000 to 10,000 is provided with 10,000 litres capacity and for a population for above 10,000 an overhead tank of 10,000 litres capacity is suggested. Of all the handpumps tried, the performance of the shaft 11 has been found to be most satisfactory. The approximate cost of the pump is Rs. 1,000.

For the maintenance of the handpumps, a three-tier system is suggested by UNICEF has been decided. The system consists of (i) the villages employee maintenance, with a staff unit consisting of one fixer and a helper with a pickup vehicle, (ii) District, and the every 100 pumps at block level and (iii) Government at village level.

As Government person from each village is selected and to given a two-day orientation training on the need and importance of water and the technique of the operation of water supply and handpumps. He is advised on record to about repairs and supplied with necessary tools. The functions of the person are:

- (i) Following to water supply in the handpumps,
- (ii) observing the operation about protected water supply,
- (iii) giving information to the block level fixer and District person from whenever there is a breakdown in the handpump.

The three tier system of maintaining the handpumps is working satisfactorily, considerably reducing the number of handpumps out of order. The scheme is in operation in various States. It is hoped to extend the scheme to the entire State. The Tamil Nadu State supply and handpumps Board is considering whether the matter of handpumps to be maintained by the District Unit should be reduced to less than 1,000. There are about 10,000 pump-rangs in the State, which are now being maintained by the Government level body. Approximate cost of such a pump is Rs. 10,000. The average maintenance charges incurred in Rs. 100

per week. The total maintenance charges including consultants, men of opines, etc. for the seven-year work cost about Rs. 7.5 million per annum.

Organization System

There is a Council of Ministers headed by the Chief Minister who is a political appointment. The highest policy making body is the Cabinet headed by the Chief Minister. Each ministry is headed by one or more departments. Each department has a secretary to the Government, who is the administrative head assisted by a technical executive. There are autonomous corporations and enterprises which like the Tamil Nadu Film Finance Board, the Tamil Nadu Water Supply and Sewerage Board, etc. There is also a Planning Commission at the State level on the lines of the National Planning Commission which major concern is to prepare development plans for the state.

The State is divided into 18 divisions, each of which is under a District Collector. For rural development purposes the State is divided into 18 Development Divisions and 174 blocks. There are several panchayat units. The village panchayat (municipality) is the smallest unit of local government. With regard to health, there is a provision national difference at the Division level. It has a number of other villages Panchayats, taluqs, municipal bodies and family welfare, etc.). It already mentioned at the block level, there is one Primary Health Centre which covers a population of 40 to 50 thousand. There are two districts and one panchayat unit. The Primary Health Centre is responsible for national care, control of communicable diseases, vaccination, health, child health, oral contraceptives, maternal health services and family planning. The role of the Primary Health Centre is water supply and sanitation consists of

- conducting periodic health and sanitary surveys for preparation of planning bodies for planning water programs;
- providing consultancy services to panchayats for the disposal of liquid and solid wastes;
- disseminating water courses regularly during health, epidemics, etc;
- collecting and sending water for analysis, inspection of springs and other water sources;
- health education.

Organization for Water Supply

The Government of Tamil Nadu constituted the Tamil Nadu Water Supply and Sewerage Board in 1971. It is an autonomous body. Its

responsibility for the planning and providing water supply and drainage facilities both for rural and urban areas. The Board consists of 4 Members and 2 Official Directors. The Chairman and the Directors are appointed by the Government. The co-ordination of various government departments is effected by the coordination of the personnel development, working in connection to the Board (Finance, public works, health and family planning, rural development and local administration, members of the municipal council, etc.). The principal officers of the Board are: Chief Engineer, Special Civil Engineer, Engineer of urban and rural water supply, Chief Engineer, Engineer of municipal development projects, Municipal Engineer and Chief Economic Officer and Secretary. Under each of these officers, there are various other supporting officers who function in relation and local levels. The organization chart for rural water supply is given (see above).

The recruitment of technical personnel is done by the Board. The respective engineers are engaged to complete post-graduate study in public health engineering so as to enable them to take up in their disciplines.

The research and development division is functioning at the State capital under the direct control of the Chief Engineer, has headed by its executive engineers. It has three sub-divisions, one looking after water resources, another industrial waste treatment and the third sub-division sewage treatment and sanitation. This division is also looking after analysis of water and sewerage samples.

Latrines

The existing latrines, which are in operation, cover a population of only 1.25 million. Apart from latrines, there are another 10 urban areas in which latrines are in operation. Even here the entire area is not covered. The coverage schemes are under execution in 7 urban areas. The capital estimated cost for provision of latrines scheme is around Rs. 120 per capita.

In the absence of sewerage scheme, night soil disposal is one of the major problems in urban areas. The public latrines are poorly maintained and are often inadequate. According to law, every house should have a latrine of the type design approved by the Public Health authorities. Provision of latrines can be effected under the Public Health Act, District Municipality Act and the Public Sanitation Act. In addition, some of these acts in national territory, such as the public buildings, officers' quarters, schools and hospitals go without adequate sanitary provision. The attempt to rural sanitation in Tamil Nadu has been satisfactory. Experiments are being conducted to develop an economical water-seal type of latrine which can be constructed with locally available materials. A sum of Rs. 1.000 has been set apart in a revolving fund for the manufacture and supply of low-cost latrine materials. The response in the latrine programme is not very encouraging. The State rural welfare board sanctioned a sum of Rs. 1.15 lakhs in 1971-72 and has subsequently raised the amount of Rs. 3 lakhs for such financial.

room for the conversion of the service type of latrines into the Flush-type type. Between 1973 and 1978 about nine thousand service type latrines have been converted into Flush-type ones. At the expense of the State, one school per block is provided with water supply and sanitary facilities.

A pilot health project prepared a scheme for provision of sanitary latrines and sanitary latrines in all the schools in a block. The cost of the latrines was Rs 1,000 and of the one cost service was Rs 200. The scheme was prepared to the Government undertaking the project work.

The Survey Data

Block Data

As mentioned earlier, 228 people were interviewed in one of the blocks. The block is well connected by a network of vehicular roads to nearby important places. There are 17 revenue villages including two townships and 23 village panchayats including 224 hamlets. The total population as per 1971 census is 100,827. The total area available for cultivation is about 50,000 acres. About 15,000 acres are irrigated.

There is a primary health centre with three medical officers, one for general purposes, one for family planning and the third for integrated child development schemes. They are visited by Health Inspectors and two health assistants who are in charge of the maintenance of general sanitation, vaccination and control of epidemics.

All the 198 households are led to one water source or another. Most of the houses have more than one source. There are 53 dug-wells, 120 bore-wells. Of the 120 bore-wells, 70 were recently drilled under the drought relief work. There are 26 overhead tanks and 3 ground level reservoirs in this area.

General sanitation is the responsibility of the sanitary inspector of the concerned block. The scheme for converting the service type of latrines into Flush-type is in operation in this block. The modified and RWH-type latrines have been constructed.

Apart from this, the Institute which conducted the study has helped to construct 100 latrines in the area.

Only a segment of the houses in the blocks are provided with open drainage facilities. The houses where in the area are advised to dispose of their sewage water through kitchen gardens

in 1968-1969. Four hundred and fifty workshops have been constructed in the area. Some also the information was taken by the Institute while was conducting the study.

There are 4 high schools, 16 Higher elementary schools and 11 elementary schools. Besides this, there are 10 Special Education Centers and 16 Basic Rural Centers. There are 13 centers under the designation child development centers. The main object of this centers is to provide a package of services such as supplementary education, immunization, health check-up, referral services, health and nutrition education and non-formal education in an integrated manner to pre-school children, pregnant and nursing mothers. Children's feeding programs are operated. About 25,000 children are being benefited by these programs.

Field Data

As mentioned earlier, 19 villages were selected and 118 respondents were interviewed. The table given below gives information of the population, the type of water sources and status of water supply. All the villages were well-served by road. Ten of them are completely managed by Barjuna, while the others by rural groups. All the villages are electrified. The respondents consisted of 38 scheduled caste, 111 Hindu and 28 Christians. About half the respondents were illiterate. About 12% had more than five years of schooling.

Drinking Water Supply

Of the 19 villages studied, eight have access to protected sources. Infiltration wells at four wells (about 70%). In two villages, people have to resort to protected water and they use only open wells.

Thirty-seven per cent of the respondents take water from open dug-wells, 15% from bore-wells and 1.5% from infiltration wells and 4.5% from rivers and 12% from mixed sources. There is always variation between the water and manner in some of the sources get filled up in summer. A larger percentage of scheduled caste villages have wells (40%) as compared to non-scheduled castes. This is mainly because of their earlier access to borewells. While 41 said that they boiled water before drinking, another 21 reported that they filtered water before drinking. The reasons given for filtering and boiling were "water contains dirt", "unfiltered water causes diseases" etc. The sources of not boiling water was "fuel water is scarce", "water is pure and no disease is caused by consuming raw water". It will be seen here that the knowledge of polluted water

TABLE 2. TYPICAL OF OBSERVATION, TYPE OF WELD, JOINT, AND MODE OF WELD JOINT.

Sl. No.	Name of the Fracture	Orientation	Type of Weld/Joint/Configuration		Mechanism of Failure/Type of Fracture
			Weld	Joint	
1.	Base Metal	1, 2, 3, 4	Open root		Through Root
2.	Weld Metal	4B, 4C	Open Bevel		Base Metal and edge
3.	Filler Metal	4D	Open Bevel		Base Metal and edge
4.	Heat-Affected Zone	4E	Open Bevel		Base Metal and edge
5.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
6.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
7.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
8.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
9.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
10.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
11.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
12.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
13.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
14.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
15.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
16.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
17.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
18.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
19.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge
20.	Weld Metal	1, 2, 3, 4	Open Bevel		Base Metal and edge

running distance is not very high. Of the 1,001 residents in the sample, 121 had more than one during the previous six months. Including 31 cases of typhus, six cases of diarrhoea and dysentery, 1 case relating to stomach disorders; 47 strokes and the remaining 59 other diseases. Only 3 per cent of the respondents always collect through main-pipe and 4.75 through letting into the street and the remaining by allowing waste water to run to the street. Only about 25 from Hanoi and 10 from the North. Thirty per cent were willing to have latrines inside their houses regardless of the size of the house. While 40% of men expressed their willingness, the percentage among women was 70%. About half of the respondents (48%) had latrine in their houses. Only 12 of the respondents said that flies breed in latrine-sheds. Only about 25 reported that flies spread diseases. Thirty-seven per cent considered them a nuisance while 12% said that they caused no harm.

In a question asked about breeding places of mosquitoes, 12% reported that their house is stagnant water, twenty per cent said drains, 7% latrine-sheds while 60% did not know. About 40 did not know those who had more than 3 years of schooling said that breeding is in stagnant water always 12% among the illiterate gave the same answer. Eighty per cent of the respondents reported that mosquitoes were a nuisance. Only about 10% said that mosquitoes spread diseases.

Summary

While 36 per cent of the urban population have protested drinking water, about 81 per cent of the rural areas in the state are without such supply. In 1955-57, 16.53 million were given an urban water supply and 16.45 million an rural water supply. The national units for providing water supply to all the urban and rural areas are 16.53 million and 16.45 million respectively. The State Water Supply and Sewerage Board constituted in 1951 is responsible for planning and providing water supply and drainage schemes to rural and urban areas. For rural water supply, funds are allocated by the State Government in the form of full grants. No grant is given to urban water supply schemes and drainage schemes. The concerned local bodies are expected to finance their own schemes. A committee's scheme has been introduced for the maintenance of latrines. A survey was conducted in one district and the scheme appeared to be very effective.

The general implication on the basis of this study is that there is a wide distance between water supply and environmental sanitation and health needs in a community. The Primary Health Centre and other Medical Institutions are expected to be operating the public with regard to various aspects of health. The study shows

that the knowledge among the public with regard to the causes of diseases and the impact of polluted water on health is poor.

There is very little concern for sanitation. The Government also does not seem to have a concerted programme for educating the community with regard to sanitation. The immediate remedy is for providing potable drinking water to the people. This is viewed as a basic necessity that needs to be supplied universally.

There is no programme to educate the rural people with regard to the steps the people have to take to maintain good health. The existing conditions are unsatisfactory. The infrastructure so far has not allowed for a vigorous programme to be followed with regard to the primary health care. A policy by the state has to be adopted to have a more systematic approach to health, water supply and sanitation. This would include aspects of primary health care. The Community Health Worker and the Curator who are now part of the infrastructure should be able to help in accomplishing this objective.

Case Study 32

Rajasthan

A study was undertaken by the Social Science Research Centre of the Rajasthan University to look at the rural water supply and sanitation programmes in Rajasthan. The study at the national level was assigned to the IIPA which, in turn, requested the Rajasthan University to conduct the study for the State of Rajasthan. The study looked at the water-supply and sanitation programmes in the State in general and also collected detailed data with regard to the same aspects in 12 villages of three districts.

Background Information

Rajasthan is the second largest State. While it occupies 32.13 per cent of the total area of the country, it contains only about 3 per cent of India's total population. The present population of Rajasthan is about 28.8 million. There is wide variation in the density of population as the State consists of large areas of desert, semi-desert areas, and fertile plains. About 19 per cent of the population resides in urban areas. The rural population (48%) live in 28,193 villages out of which 11,329 are inhabited. Almost 60% of the total population of the State live in villages having a population of less than 500 persons. The average size of the household is 5.76 persons. The total population of the scheduled castes is about 16 per cent in the State. There is also scheduled tribe population of about 12 per cent. The tribal population is concentrated in a few districts only and their percentage ranges from about 40 per cent to 70 per cent in these districts.

The rate of literacy is rather low in Rajasthan, the overall rate in the rural areas being 16 per cent - among males 21 and among females 4 per cent. While in 1951/52 only about 51 per cent of the members of age-group 5-11 used to go to school, in 1973-74 it was about 88 per cent. Only about 2 per cent of the boys and girls of the age-group 15-19 were in school in 1951-52, but in 1973-74 it was 21 per cent. The number of primary schools in 1971 was 18,531, middle schools 4,006, higher secondary schools 1,317 and colleges 96.

The population of the State is divided into 51.39 per cent workers and 48.61 per cent non-workers. The male population of the State is divided into 32 per cent workers and 68 per cent non-workers. The proportion of non-workers in respect of the female population is 51 per cent and only 8 per cent are designated as workers. Agriculture is the mainstay of the people in the State. More than 70 per cent of the male working population and 83 per cent of the female working

population was engaged in this work. The total water supply in Rajasthan is 47 per cent of the 1941 level. There has been a rapid depletion of the area now as it was only 26 per cent in 1938-39. Only 11 per cent of the 1941 irrigated area is under irrigation. The main source of irrigation in Rajasthan is Indira Canal, which accounts for irrigating 41 per cent of the total irrigated area. The second important source is tanks, which account for 27 per cent.

Surface water is very much limited in arid Rajasthan. The only source is underground water. The Groundwater Survey and the All India Soil Research Institute are studying the area for underground water potential. The water in the arid zone is very available. Only 11 per cent of it is fresh water.

Only 17 per cent of the villages have electricity. While there is a great demand for electricity, it is in very short supply.

Medical facilities are available in the towns and cities. In the rural areas the situation is rather unsatisfactory. For the State as a whole, the demographic ratio is 1.8:100. (1:100 males to 100 females). There are only 100 primary health centres. This is less than half the required number, as the norm for a PHC in a population of 40,000. There are very few medical colleges. The exact information regarding their status is lacking.

The water supply problem and irrigation

The problem of drinking water in Rajasthan, both in urban and rural areas, has been very acute. At the time of independence piped water supply was available in only three major cities of Rajasthan. By the end of December, 1959, water supply to all the urban areas, totalling 129, has been made. In the villages only 2,008 out of the 11,848 have been supplied with piped supply which benefits about 4.5 million people. The Rajasthan villages located in different areas are to be treated differently. In the western zone, there are 3,381 villages of which 1,129 have drinking water supplied for human consumption. It affects 700 villages. The water is brought by means of an all-weather source people do not in the drinking. Only 1,129 villages (18 per cent) in this area have been provided with safe water systems for drinking purposes. In the north and northern region, there are 11,000 villages. The water problem in this area is extremely serious, which is faced in 3,400 villages. There is a source of fluoride in 1,129 villages and drinking water in 1,000 villages, and tankwater water in 100 villages. In 1959, only 1,415 villages have been provided with safe drinking water.

In the state studies the problem of excess fluoride is more serious. More, out of the 12,708 villages, 1,881 villages have this problem. Only 41 villages have been covered in this work, although the extent of fluoride is slow. It has a cumulative effect and people develop deformation of the bones. The healthiest water problem is also acute.

Classification of Villages

A preliminary survey was conducted and water samples from all the villages were collected and analyzed. On the basis of this analysis the villages were classified as follows:

1. No source and healthiest water villages
2. Excess fluoride villages
3. Guano-based fluoride villages
4. Sulphate and phosphate villages
5. No problem villages
6. Villages at source

Another approach to categorize the village is given in the table below.

Category	Brief Description	Number of Villages
No source village	Villages having no potential source of water	1,114
Healthiest I	Villages where groundwater has TDS more than 1000 ppm or chlorides more than 1000 ppm	1,114
Guano-based fluoride villages	Villages where guano-based waste have been deposited	2,408
Excessive fluoride added villages	Excess fluoride more than 1.5 ppm	2,991
Healthiest II	TDS between 1000 to 2000 ppm or chlorides 100 to 1000 ppm	2,709
Sulphate and phosphate villages	Groundwater more than 15 percent sulphate or hardening salts more than 100 mg/litre	2,220
No problem villages		8,284
Total		22,834

India is one of the most afflicted countries in the as respects its sanitation. It is estimated that 1 million refuse collect from governments of which 1.3 million are in Rajasthan. The sources of germs were infection in the surroundings in which people go to be infected. It refers to the highly infected two districts about 25% of the total population have suffered from this disease or more than in their life. On an average the patients of government are liable to work for about two months. The average loss per year is estimated to be about Rs 10 million.

A sum of Rs 100 million has been spent by the Government of Rajasthan in providing drinking water in the State up to 1961-62 since the first five year Plan. Out of this, Rs 120 million were spent in urban areas and the remaining Rs 80 million in rural areas. The State Government has estimated that in order to meet the drinking water available for the remaining population, the financial requirements would be worth Rs 1,000 million in ten years. In the Fifth Five Year Plan, the Government envisages to spend Rs 40 million to develop water systems in villages where there is no source of drinking water. It is proposed to cover 22,150 more villages under the Rural Water Supply Scheme in the Fifth Plan. Recently the World Bank has agreed to make a loan for water supply schemes in rural areas. In the year 1966-67, the Central Government gave a loan of Rs 20 million for this purpose.

Sanitation

It is well-known that good water supply by itself without proper sanitary facilities cannot have the desired effect in health. A study carried out in the capital city of the state revealed that insanitary facilities of sanitation is causing a loss of Rs 12 million in terms of labour lost and about Rs 30 million in medical treatment etc. Lack of financial resources is the major constraint in providing sanitary facilities. However, the State is just beginning to solve the problem of urban sanitation. The amount required for all the towns is estimated to be Rs 1,150 million. During the Fifth Plan period (1961-66) drainage schemes for six towns were taken up. Two of these, however, are likely to spill over to the Sixth Plan. The problem has only been dealt with in urban areas. As much as 10 lakhs 4000 are in the rural areas.

The Administrative Situation

At the state level, the Chief Minister with Ministers in charge of various departments form the Cabinet. There is a secretary belonging to the Administration section in charge of work of these departments. At the District level, a District Collector is in charge. There are other district officers holding charge of various functions.

In 1969, an act was passed establishing Local Self Government bodies, this provided at the District Level and Panchayat Samitis at the block level. The village level also has an elected body called the panchayat. Several panchayats (MPTC) and Pils (United Services have been constituted and the Government functionaries at the village level work under this service. The developmental activities for the rural sector are being conducted through the panchayati institutions.

Administration of Public Supply

The authority to provide water supply is vested as well as rural areas vests with the Public Health Engineering Department. This Department has an organization extending to the District Level. It has two important sections - one deals with the construction and the administration while the other is the research and design wing. The research and design wing has prepared 18 master plans for every division delineating the extent of the problem, the chemical analysis of available water and proposals for constructing a filtration. There is a Sanitary Engineer's Office which conducts research in the hydrogeological conditions of the various areas. To also undertake testing of equipment, on its own behalf or on behalf of the Public Health Engineering Department. The Department took 4,074 wells for abstraction and 200 wells for drinking water up to December 1974.

One of the drawbacks of the PHS set-up is that its organization is only up to the district level while the area of operation and responsibility extends up to the village level. There is also a serious problem in the installation of pumping sets is done through contractors and not by the department. Although the contractors are supposed to be responsible for the smooth working of the installations they have not been found to having this aspect of their concern. Villagers find themselves helpless when their pumping sets are broken. They have to report through their panchayats to the district collector and through the district office to the PHS. This cumbersome procedure delays the urgent job of maintaining and repairing.

Access of Villages

THIRTEEN villages in three districts were surveyed. The groundwater problem is quite serious in one of the districts surveyed. In one district the villages were less than 10 kms from the railway station while in another villages were less than 40 kms. Even of the villages in one district had electricity, and even of the villages in the other two districts did not have any electricity.

The population varied from 154 to 8,488. Only in two villages there were no child communities. In the other villages their population ranged from eight to about nine hundred. Except in one village, the majority were dependent on agriculture for their livelihood. Four villages did not have any schools. Of the remaining, four had primary schools, seven had middle schools and three had high schools.

Water Supply

Out of the 15 villages, three were classified as 'no problem villages', although one of them had no water supply. Of the five villages which were classified as 'having access of water', three had no water supply. Four of the villages were classified as 'poorly served villages', but only one of these had water supply. In one village, the water was supplied through a canal which was protected against

The total number of respondents in the villages was 111. Sixty per cent of the people interviewed got water from their wells, streams about 10 per cent got it from an underground well, and five per cent from a handpump. About 20 per cent got water through taps. About 20 per cent of the people used the same source of water for all purposes (cooking, bathing, washing, etc.). Nineteen per cent of the people had their water source within the house while about 4 per cent had to go beyond 200 metres to get water. About 20 per cent had to go less than 200 metres, 20 per cent between 201 to 120 metres, and about 7 per cent between 121 to 500 metres. Fifteen per cent spent less than ten minutes for getting water, 19 per cent between 10-20 minutes, 22 per cent between 20-30 minutes, and 13 per cent between 30 to 60 minutes. Those who had water taps in their houses had to pay Rs 4 per month for the water supply to their households. The others did not have to spend any money for getting water. When the respondents were asked as to the reasons for using a particular source of water, 126 respondents (58%) said that they used the particular source because it was best in their houses, while 19 stated because the water from that source was better. Six said it was good for health and 12 said that there was no other source available.

None of the respondents boiled water. When asked how the water was, 17 (15.3%) said that it was never done before, 19 (17%) said that boiling with water levelers, 30 (27%) said that water from the well was drunk and there was no need to boil it. About 3 per cent mentioned generally as a cause for not boiling. The general impression gathered by the researchers was that, except in the government industrial areas, people had no particular knowledge about the relationship between water supply and their health.

Health and Sanitation

In one village, one primary health centre was functioning. The other villages were directly under the purview of the District Hospital Under the District Headquarters. One village has an approved dispensary which in addition the villagers have constructed a maternity centre out of their own contributions. In the 150 respondents, 10 said that there was a primary health centre in the village. When asked about the frequency of visits by doctors, 45 (about 30%) said that they came once, while 46 per cent said that they rarely came, 4 per cent said that they came twice or thrice a week, 3 per cent came a week and about 11 per cent came a fortnight. In the case of ordinary diseases, 17 per cent went to the Dispensary hospital, 30 per cent to the Government All-India Medical, about 20 per cent to the Primary Health Centre, and the remainder went for private treatment. In the case of serious sickness, 44 per cent went to the Government All-India hospital, 11 per cent to the Primary Health Centre, 10 per cent for private treatment and only 4 per cent to the Government Dispensary hospital. About 30 per cent of the people had no disease during the last six months. For the others, all the villages reported having cases of malaria, ven, of gonorrhoea, three, of boils and sores, and one, of cholera. Twenty-two per cent of the people had spent more than Rs 200/- for the treatment during the previous six months, 41 per cent had spent less than Rs 50, 12 per cent between Rs 51-100, and 14 per cent between Rs 100-200.

The finding that the respondents got was that people were willing to spend money for treatment. The most favoured treatment was injections. They seemed to have more faith in treatment through injections. In a majority of the cases, less than a fortnight was lost due to illness.

The respondents were asked to specify the diseases which were caused because of the type of water they consumed, and the diseases caused by lack of sanitary conditions. In the villages infected areas, people mentioned drinking water as the cause of the disease. However, it is interesting to note that 45 per cent said that they did not feel that there was any relationship between drinking water and diseases. As far as sanitary conditions are concerned, about 40 per cent said that malaria was caused by lack of sanitary conditions. Six respondents said that typhoid was caused by sanitary conditions, whereas 11 patients said that cholera was caused by the same. About 40 per cent said that they had no knowledge of any diseases being caused by sanitary conditions. The bonded and indentured (49%) people said that mosquitoes caused malaria and 47 (30%) said that they caused boils. 11 said that they caused sores, and six said they disturbed their sleep. The villagers were concerned about the lack of drainage system, which allowed the mosquitoes to breed. There was lack of co-ordination between the Public Health Engineering Department and the Department of Health. Some villagers said that

pigeons and bats should be provided only in those places where simultaneously drainage facilities were also provided. The respondents are supposed to be in charge of the drainage system, but the village people said that neither the Panchayats had enough funds nor was the Panchayat leadership under pressure to improve the sanitary conditions. There was much greater pressure on the Panchayats to toilet taps, from where the hand-pumps had been installed, for the absence of proper drainage, water got stagnated in small ponds and open spaces (bairi, or it possible that the health workers whom which has been envisaged might provide the needed health education to make the villagers conscious of the need for maintaining sanitary conditions and to show how the village people themselves could do so. The present approach of the villagers is to depend on the Government for everything that needs to be done in the village.

As regards the mobilization of the health personnel at village level, while about half said that they did nothing, another half said that they sprayed medicines on water ponds and DDT in houses. About 40 per cent said that they were unable to kill the mosquitoes, while about 10 per cent said that they used fish, bleaching powder and DDT. The remaining about 40 per cent said that they did nothing to kill the mosquitoes.

The respondents were asked to identify places of breeding for the flies. Most of them said that they generally breed in dirty places. A number of them said that they breed in fields before the upcoming monsoon. About 20 per cent did not know where the flies bred. A large number of the respondents were aware of the basic flies around, such as spreading diseases like cholera and causing skin irritation. About 5 per cent said that they cannot see them and about 20 per cent did not know. Almost all the villagers said that the health officials did nothing to eradicate the flies. A few said that the villagers were advised to keep their houses and surroundings clean. Some said that they removed garbage or spread lime. The respondents said that cleaning of corners, removing of garbage, spreading of lime are done by health officials only if they come to town at an impending danger of a cholera epidemic. The Public Health Department seems to be more active. About 50% did nothing to kill flies. About 50% said they tried to keep the houses clean, while another 5 per cent said that they sprayed DDT or used smoke. When the respondents were asked to suggest ways and means to fight the menace of mosquitoes and flies, most of them said that the Government should spray DDT, and a few said that they should keep their villages and houses clean. As mentioned earlier, their dependence on the Government for the elimination of the village came through in this question also.

Only 10 persons had latrines in their houses. It is not easy for the people to have a latrine in their houses as the layout of their houses does not provide for constructing a latrine. Both of the houses are mud houses. Moreover, there is hardly any provision

for either septic or a flush system in the villages. One of the big villages has one septic, people have to walk between one hundred to five hundred meters in the absence of latrines. When asked as to whether they would like to have latrines in their houses, 15% replied in the affirmative, while 85% said 'they would not'. It seems that the bigger villages, villages which are economically better off and villages which have more constructions appear to be in favour of latrines inside the house. It may also be mentioned here that the upper caste people in this area choose latrines and some may have said 'yes' for having latrines because of this. Of those who had replied in the affirmative, a question was asked as to why they did not have a latrine at home. SIXTY OF THEM SAID THAT THEY HAD NO MONEY, 11 'no place', 18 'no adequate planning arrangements', and 11 'never thought about it'. It might be mentioned here that a 'waterless type latrine' called the Bataka type has been developed and it could be introduced for this caste too. People in only three villages were aware of this type of latrine. There seems to be no provision for demonstration of latrines in any of the villages. The health officials said that this task was assigned to the Bhatkars and as such they did not take any action. About 60 per cent said that no objection to have public latrines in the villages. Some 51% per cent had reservations because of the problem of cleaning.

The respondents were asked about the drainage system inside the village. Only a few individuals have proper arrangements for drainage, like diverting the water to the kitchen garden, or to septic inside and outside the house. People seem to be satisfied with the Bataka type of drainage outside their houses. People were asked to identify where they dumped their garbage and dung. Forty eight said that they throw it outside the house, 11% had no plan. 10 said near the cattle shed and 11 said that they used the public common pit. The researchers observed that the common pits made by the people were not deep and had become breeding places for flies and mosquitoes.

The general picture that emerges from this analysis is that the type of settlement, including the problem of pollution, does not seem to influence the thinking of the villagers. Except for the people living in infected areas, people are not conscious of the nature and effect of the waste they take. It appears that the level of economic standard plays a significant role with regard to the sanitary problem. The attitude towards latrines, disposal of garbage and other wastes is more positive in the economically better off villages.

Only in some houses, were there separate kitchens. In the other houses a space in the veranda or backyard is used as a kitchen. Fifty-five of the respondents (75%) had plans for bathing in the house. The others used the well or the backyard place for bathing.

As to the question as to how satisfied they were with the arrangements for drinking water in their villages, forty-eight per cent said that they were fully satisfied, 33 partially satisfied, while about 19% were not satisfied at all. There was clear difference in the districts. In the districts in which there is government intervention, there was very good satisfaction.

With regard to sanitation arrangements only 32% were fully satisfied, 42% partially satisfied while 26% were not at all satisfied. Twenty-six per cent of the respondents were fully satisfied with the arrangements for health while 42% were partially satisfied, 26% were not at all satisfied. In villages where better facilities were available, the people indicated their satisfaction. In all the others dissatisfaction was expressed.

The trend of the responses seemed to be that safe water supply, sanitary facilities, and proper drainage should be provided by the government. To the question asking for suggestions to improve the unsatisfactory situation, 148 persons (88%) said that the Government should do it, 142 did not respond to this question. There was no indication of any initiative being taken by the people themselves to solve any of these problems.

When asked about the personal problems, 32 mentioned poverty and unemployment, 22 educational and marriage expenses, etc., 22 water supply, 19 sickness and 21 electricity. Regarding the problems of the village - sanitation, education, medical facilities, communication and transport, water supply and electricity were mentioned in that order.

Position of Villagers

In the villages where draw-wells were still the prevalent source of water, villagers had in some cases tribal communities would not directly take water from the wells under care of other castes. They had their own arrangements. In cases they had no arrangements of their own, they had to wait with their pitchers and someone from the other caste would take water from the wells and fill their pitchers. In the areas studied the problem was real although the Government has tried to dig wells for these communities to share own facilities. In the areas where water supply is either by pipeline or handpumps or from free community wells, the villagers are allowed to take water but care is taken to see that their pitchers do not touch the pitchers of other caste people. Such restriction is helping to remove untouchability as far as water supply is concerned.

Status of Women

Eighty percent of the respondents said that the women were fully assimilated when discussing the household water system. 87 percent said that they were partially assimilated and 48 said that they were non-assimilated. When the respondents who had said "the men assimilate" were asked as to why they "did not assimilate" them. 37 out of 87 said: "women were less intelligent" and the other said "no tradition in the family". The socio-economic analysis showed that the peasant class and the urban class tended to assimilate the women classes among the farmers is was equally divided between those who assimilate and those who do not. Among the business community hardly anybody assimilated the women in the house. It was also found that caste¹⁰ and religious problems were the ones in which the women were assimilated. In questions of economic facilities like water in well the assimilated, purchasing and selling property, etc. women were not assimilated. There are no organizations for women in the 12 villages surveyed.

To the question as to how women would utilize the water saved because of water supply made available to them, most of the respondents said that they would spend it in agricultural work, a few of them said that they would wash more in the houses while some suggested that they would learn weaving and sewing. Only 12 persons only said that they would spend them in getting more about 12% said that this would allow them to save more money by some labour.

The upper caste still observed purdah, in the majority of other castes, there is only partial purdah (only covering the face). Among the scheduled castes about two-thirds observe partial purdah whereas one-third do not. Among the tribal communities all the women observe partial purdah.

It would, thus, seem in the rural communities the status of women is not very high.

Summary

Of the 12 villages surveyed, only 3 were classified as non-peasant villages. In the majority of the cases, the major water source is the handwell. The more water source was cited for all purposes. There seemed to be little knowledge with regard to the relationship between the health conditions and the sources of water supply among the village people. It is interesting to note that urban supply had a less priority about the question was asked as to what the

problems of the villages were, National facilities are inadequate in most of the villages. Sanitation conditions are extremely unsatisfactory. The people depend on the government to solve the problems of the villages; while we can deplore this feeling of dependence, a politician encouraged transferring the initiative and the capacity of the people to solve their own problems would indicate that they have access information. Constructing a handpump is not only a complicated procedure but also an expensive proposition (it could cost anything from Rs 2,000 to Rs 10,000). This is not to say that the 14000 spent this year will be used on handpumps. The importance of the handpump, digging latrines, making compost pits as well as doing something about the drainage system. The hierarchical structure of the decision has been bearing on the implementation of programs. The Government is making special efforts to provide for various countries to the Department provided that is sufficient efforts. The District officers are not always able to realize the benefits of the programs that are being implemented in the villages. In the supply of water this fact has to be taken into consideration.

The progress on the state seems rather slow. The financial constraints and the organizational limitations to see what can a very rapid expansion of the programs of supplying drinking water in the rural areas.

Only in times of emergency has government been involved

Most of the water conservation work has been supply augmentation in water the allocation. The need is for a continuous effort in getting people realize the benefits to their health if they do not take preventive action. At present, there are no functioning of the Health Department operating at the village level. The intervention of the Community Health Worker who would function at the village level should provide an opportunity to introduce an educational programs which regard to primary health care.

The study designed by the JMW was concerned with drinking water supply and sanitation programmes were an integral part of the health programme. It was also concerned as to whether these components were within the Council National Development Policy and Plans. The research design had assumed that the lack of intersectoral coordination and the lack of community involvement were responsible for the failure of programmes. There was another assumption behind the study, namely that the awareness of this failure has resulted in greater emphasis being placed to accelerated development. The data were collected at national, state and village level in look at the relationship between drinking water supply, sanitation, health and the development processes.

The drinking water supply programme seems to operate in isolation. At the national level, the Department which is responsible for water supply and sanitation is separated from the Ministry of Health. At present the contacts are rather infrequent although the Director General is in the same building. The Ministry of Health does not seem to be very concerned with the programme of water supply or sanitation. There is more effort by the CPWD to have a contact with the Ministry of Health and their support. There is scope for much greater coordination.

In one of the states studied there is a separate organization for the water supply and drainage program. Sanitation is the Department of the Department of Health, Public Health, Medical Research and Social Administration. The programme seems to operate on its own. When the question was raised with some of the officials about the integrated approach, they said that while this was the policy in theory, in practice it was difficult to implement. They also felt that their primary concern was to provide water to the rural areas. Drinking water was considered a basic necessity which had to be provided. While the need for having an integrated approach was recognized, they felt that they should not wait for this to be implemented before providing water. The assumption here is that without the basic amenities are needed this is called development. At the state level, there were a number of villages which have no access for drinking water. If the water supply is looked at as an urgency then the perspective of the problem will be different.

In the other state studied, the Public Health Engineering Department is in charge of the water supply. This Department is under the Ministry of Health but for all other practical purposes it operates as an independent organization. There is a little coordination between their programme and that of the Department of Health. In one of the villages visited, about one-third of the houses had been supplied with taps. When the villagers were asked as to what the consequences of the slow water supply was, some of them said that there was no impact on health.

The water from the tanks was let run into lanes where it stagnated and became a breeding place for mosquitoes. The question was discussed with the PWD. The feeling here was that the major job was to provide water to the people. They also had set targets which they have to achieve. When asked why making analysis should not be compulsory in those houses where taps were supplied they said that the water can be used right alongside the people's houses having the taps in their houses.

The Rural Development Programme either at the national or state level do not have a strong emphasis on water supply. At the national level the schemes under programmes which are one of the major programmes for rural development is the only one which refers to supply of drinking water. In fact, special attention is being made through this programme for the supply of drinking water. The agencies are either small. It may also be noted here that where there is a borewell which is used for irrigation fields, often people use this as a source for drinking water. In the villages, there is an understanding that when people wish to take water for drinking from the borewells they should not be prevented.

The other question concerned the extent of the people's participation. The people in the rural areas in India by and large expect the government to provide the facilities for them. One of the reasons for this is that in many instances the rural people do not have either the skills or the resources within the community to solve even of their problems. Even for cases repaired of the handpumps, the rural people depend on the government. When the question was asked as to the extent to the initiative to improve the unsatisfactory conditions of health and sanitation and water supply, the majority of the people said that the government should take the necessary steps. However in the community based villages, there seems to be some feelings that the people themselves should do something to improve their lot. The overall situation is that the rural people live in poverty (it is estimated that about half the population live below the poverty line). Elected local bodies are the organizations through which development programmes will have to be implemented.

They have the power to tax so that some collection can be undertaken by themselves. The collection of tax has not always been easy in rural areas. In Tamil Nadu, however, the local bodies have imposed a tax and are collecting it. It is through the funds collected that the payments were made to the state government for maintenance of the handpumps. Another effort in Tamil Nadu to involve the community is having a caretaker from the village in which the

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